The Dissertation Committee for Lara Adrienne Latimer Certifies that this is the approved version of the following dissertation:

DIRECT OBSERVATIONS OF IN-SCHOOL FOOD AND BEVERAGE PROMOTION: ADVANCES IN MEASURES AND PREVALENCE DIFFERENCES AT THE SCHOOL-LEVEL

Committee:

Keryn Pasch

John Bartholomew

Alexandra Loukas

Steven Kelder

Andrew Springer

DIRECT OBSERVATIONS OF IN-SCHOOL FOOD AND BEVERAGE PROMOTION: ADVANCES IN MEASURES AND PREVALENCE DIFFERENCES AT THE SCHOOL-LEVEL

by

Lara Adrienne Latimer, BS, MA

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Dedication

This dissertation is dedicated to you, Mom, as your unwavering and unconditional support has contributed to my successes in countless ways. Your confidence and pride in me are inspirational and invaluable, and I love you!

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Lara Adrienne Latimer, PhD

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Supervisor: Keryn E. Pasch

Previous research shows that food/beverage promotions are prevalent in traditional channels, such as television, and that children's exposure to these promotions may be associated with dietary- and weight-related outcomes. However, little research has been conducted on in-school food/beverage promotions, despite evidence that promotions are present in schools and that similar associations between students' exposure to promotions and weight-related outcomes may exist. In an attempt to better understand in-school food/beverage promotions, the current study was undertaken. Specifically, the reliability of a new electronic tool to document direct observations of in-school food/beverage promotions was examined. Direct observation data, using the new tool, were collected in 30 middle schools in central Texas, and a new coding system was developed to categorize and quantify these data. Analyses were run to examine percent agreement between records for intra- and inter-rater reliability. Analyses were also run to assess percent agreement between coded records in order to examine inter-rater reliability for the new coding system. Descriptive analyses on direct observation data were conducted in order to further examine the types and prevalence of food/beverage promotions. T-tests were run to examine variations in food/beverage promotions by

school-level differences including economic disadvantage and percent minority. Overall, sufficient intra- and inter-rater reliability was established for the new electronic data collection tool. Sufficient inter-rater reliability was found for the new coding system. Direct observation data showed that food and beverage promotions are prevalent in central Texas middle schools, particularly those displaying nutrition education messages, commercial products, brand logos, and unhealthier food/beverage items. Additionally, a higher prevalence of food and beverage promotions, especially for less healthy products, and those displaying commercial brands and visible logos, were found to vary by school-level differences. Specifically, less economically disadvantaged and lower percent minority schools had significantly higher levels of these types of promotions, as compared to more economically and higher percent minority schools. Future studies should further examine prevalence of and school-level differences regarding in-school food/beverage promotions, and if these promotions are associated with dietary- and weight-related outcomes. Results may inform stricter policies regarding in-school food/beverage advertising aimed at youth.

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Chapter 1

Executive Summary

1.1 Summary Background and Significance

A third of children and adolescents are overweight (Ogden, Carroll, Kit, & Flegal, 2012), which is associated with negative physical and mental health outcomes (BeLue, Francis, & Colaco, 2009; Freedman, Dietz, Srinivasan, & Berenson, 2009). Lifestyle factors, including diet, affect a child's weight status (Institute of Medicine [IOM], 2005), as intake of energy-dense foods (i.e., sugar sweetened beverages and packaged snack foods) has increased over time (IOM, 2005).

Advertising for these types of foods is a possible explanation for increased youth consumption (Halford, Boyland, Hughes, Oliveira, & Dovey, 2007; IOM, 2007). Primarily, television advertising in relation to dietary choices has been examined. Positive associations with exposure to television ads promoting unhealthy foods and children's preferences for and consumption of similar products have been found (IOM, 2006). However, less research has been conducted on the possible effects of other forms of marketing in environments where children spend significant amounts of time.

A significant amount of total dollars food and beverage companies spent on marketing in 2009 was allocated to promotion channels other than television, including schools (Federal Trade Commission [FTC], 2012). Food and beverage advertising in the

school environment includes posters and other signage, vending machines, advertising in school newspapers and on Channel One, corporate-sponsored classroom activities and lessons (IOM, 2005), and food sales for fundraising (Caparosa et al., 2013). Specific examples are scoreboard advertising, gym banners, ads in school yearbooks, textbook covers, screen savers on school computers, and athletic warm-up suits (Story & French, 2004). Some companies have developed lines of promotional and educational products intended for advertisers to place brand logos, which are dispersed to students for free (Story & French, 2004).

It is not surprising that food and beverage companies find schools an ideal environment to promote their products. Children are required to attend and spend about 7-8 hours in school daily and constitute a captive audience who is less likely to play an active role in the types of product promotions to which they are exposed. Specifically, while children may have input on the types of items that are purchased for the home and the opportunity to change channels when television advertisements appear, they have less input in what is promoted in the school environment. Commercial food companies can more effectively market products in the school environment, while providing a direct incentive to schools.

As such, it is hard to ignore the pervasiveness of commercial products in competitive food outlets in schools, including the presence of product logos and brand promotion. Evidence suggests that food and beverage promotion in schools is prevalent (Whatley Blum et al., 2011), and the presence of commercial products and logos has been

associated with students' frequent consumption of unhealthy foods (Minaker et al., 2011). It is possible that as students are repeatedly exposed to these products and images in school they may choose these items both in- and outside of the school environment. Additionally, in-school product promotion may be all the more persuasive, as qualitative research shows that children may view things promoted in the school environment as inherently healthy (Hesketh, Waters, Green, Salmon, & Williams, 2005). Specifically, children may view unhealthy items available in schools as relatively healthy because of the environment in which they are promoted, despite contradictions with school-based nutrition education (Hesketh et al., 2005).

There are several possible theoretical explanations for how advertising influences youth. The Elaboration Likelihood Model proposes that people may process advertising messages through either a central route or peripheral route (Petty, Cacioppo, Strathman, & Priester, 2005). The peripheral route does not require as much effort as the central, and individuals may be persuaded more by simple cues, such as product packaging and length of advertising message. Although attitudes formed via peripherally processed messages tend to be less persistent, there is evidence that children may still be highly affected by attitudes formed in this way (Harris, Brownell, & Bargh, 2009).

The Mere Exposure Effect indicates that individuals may prefer stimuli that they have been exposed to numerous times over one that they have only experienced once (Harrison, 1977), which may explain why food and beverage preferences may develop from repeated exposure to products/messages, even if the individual is unaware (e.g.,

exposure to advertisements in the media, walking through the grocery store, brand logos in schools) (Harris, Bargh, & Brownell, 2009). Empirical evidence from studies with children supports the idea that they may choose certain products (health and unhealthy) after exposure to messages for them (Borzekowski & Robinson, 2001; Goldberg, Gorn, & Gibson, 1978; Gorn & Goldberg, 1982).

Priming is another potential explanation for how advertising affects youth, and refers to automatic responses that occur outside of intention or awareness. Despite a lack of conscious processing, attitudes may develop through repeated pairings of objects or persons with emotions, motivations, or situations (Baron & Banaji, 2006; Rudman, 2004). Sensory cues related to food, such as those that are often provided in advertising (i.e., "hot" and "moist"), can increase consumption (Ferriday & Brunstrom, 2008), and children may eat more after exposure to "fun and happy" food advertising messages than when they are not exposed to these types of messages (Harris et al., 2009).

Social Cognitive Theory is a theoretical model that is based on reciprocal determinism, or the idea that individuals, their behavior, and the environment interact with and affect each other, (Bandura, 1986). The environment, as it relates to food and beverage promotion and how it may affect youth, consists of physical and social components. The physical environment (e.g., presence of food and beverage advertising) and the social environment (e.g., interactions with and observations of others in the immediate environment where advertising is present) may influence a child's behavior. Children may choose unhealthy food items due to modeling of the behavior by peers

(Birch, 1980), and may be influenced by possible associations of power or prestige of school officials and staff (Palmer et al., 2004).

Although evidence exists regarding the potential influence of in-school food and beverage promotion, there are limitations to the current body of literature. Specifically, an effective and efficient tool to document the in-school environment has not been established, and little objective data exist regarding the school food environment. Thus, the current project was undertaken, in which the intra- and inter-rater reliability of a new electronic tool to document food and beverage promotions in schools was examined. Additionally, analyses were conducted to assess the type and prevalence of in-school food and beverage promotion in central Texas middle schools.

1.2 Current Study Aims

1) Examine the intra- and inter-rater reliability of a new instrument aimed at measuring direct observations of food and beverage and physical activity promotion in a middle school environment.
2) Gain a better understanding of the middle school food marketing environment, including the prevalence and type of food and beverage promotion and how the school food marketing environment may vary by economic disadvantage and percent minority characteristics of the schools.

1.3 Research Questions and Hypotheses

Due to the limited previous research on types and prevalence of in-school food and beverage promotion, hypotheses were not proposed for every research question.

1) Is a new electronic tool a reliable instrument to measure food/beverage and physical activity promotion in middle schools?
2) What types of food/beverage promotion may be encountered in a middle school environment?
3) What is the overall prevalence of healthy food/beverage promotion in a middle school environment?
4) What is the overall prevalence of unhealthy food/beverage promotion in a middle school environment?
5) What is the proportion of healthy to unhealthy food/beverage promotion in a middle school environment?

   It was hypothesized that there would be a higher proportion of unhealthy to healthy food and beverage promotion in the majority of middle schools.
6) How do the types and prevalence of healthy and unhealthy food/beverage promotions vary by school-level variables (i.e., economic disadvantage, race/ethnicity)?

   It was hypothesized that economically disadvantaged schools would have a higher prevalence of unhealthy food and beverage promotions, as compared to schools that are less economically disadvantaged.

1.4 Definition of Terms

- *Advertising* – the most visible form of marketing, intended to capture consumers' attention to a product through various channels (e.g., television, print, personal contact, the Internet). (IOM, 2005).

- *Body Mass Index (BMI)* – an indicator of body fatness, based on an individual's height and weight.
- *Competitive Foods* – Foods and beverages sold or made available to students that compete with the school's National School Lunch Program (NSLP), School Breakfast Program (SBP) and Afterschool Care Program (ASCP). These foods include, but are not limited to, foods and beverages in vending machines, school stores, in school fundraisers (including food sold or provided by schools staff, students, or parents).
- *Coordinated Approach To Child Health (CATCH)* – a school health program to increase healthy eating and physical activity among elementary and middle school children by promoting healthy behaviors among students, teachers and other school staff, and parents.
- *Foods of Minimal Nutritional Value (FMNV)* – Foods that are artificially sweetened and/or do not contain a sufficient amount of specified nutrient (e.g., protein, vitamins A and C, niacin, calcium) per serving. Examples include: soda water, water ices, chewing gum, and candy.
- *Healthy food and beverage* - foods and beverages that fit within the "go" guidelines provided by CATCH. These are foods that are minimally processed and low in salt, sugar, and unhealthy fats. Examples include fresh and frozen fruit, vegetables, whole grains, and fat-free dairy products (See Section 3.0, Table 2).
- *Logo* – the visible and recognizable image of a product or brand, which may be displayed in addition to or instead of the brand name

- *Marketing* – a set of processes to communicate the availability or value of products, which may encompass advertising and product promotion, and may be used through carious channels, such as television, print media, or the Internet.
- *National School Lunch Program (NSLP)* – a government-assisted meal program in public and some private schools and childcare settings that provides nutritionally balanced, low-cost or free lunches.
- *Overweight/Obesity* – Overweight or obese is defined as a BMI > 85^{th} percentile; obese is defined as a BMI > 95^{th} percentiles, according to CDC 2000 Growth Charts (CDC, 2000).
- *Promotion* – the act of encouraging or supporting a product through advertising, availability, and/or accessibility
- *School food environment* – represented by foods that are advertised, promoted, and available in school
- *Unhealthy food and beverage* – foods and beverages that fit within the "slow/whoa" guidelines provided by CATCH. Examples of these items are foods made from refined, white flour, baked potato chips, and low-fat dairy products (See Section 3.0, Table 2).

Chapter 2

Literature Review

2.1 Background and Significance

Obesity Prevalence

The weight status of children in the United States mirrors that of the rest of the population. The astounding number of individuals who are either overweight or obese is not limited to adults, and combating childhood obesity is a current health priority (U.S. Department of Health and Human Services, 2010). According to Centers for Disease Control and Prevention (CDC) growth charts, the current criteria for overweight and obesity among children is a body mass index (BMI) greater than or equal to sex- and age-specific 85th percentile for overweight and a BMI greater than the 95th percentile for obesity (CDC, 2000). Data from the most recent National Health And Nutrition Examination Survey (NHANES) show that approximately 32% of children and adolescents ages 2-19 are either overweight or obese, and 17% are considered obese (Ogden, et al., 2012). Alarmingly, about 12% of youth are above the 97th percentile for BMI. This same study showed that approximately 33% of boys and 30% of girls ages 2-19 are overweight or obese, with about 19% of boys and 15% of girls categorized as having a BMI $\geq$ 95 percentile. Non-Hispanic white youth, ages 2-19, have an overweight prevalence of 28% and an obesity prevalence of 14%. Thirty-nine percent of Non-

Hispanic black adolescents are overweight, and 24% are obese. Thirty-nine percent of Hispanic youth are overweight, and 21% are obese.

The most recent state-level data on childhood obesity show that approximately 18% of children ages 10-17 are overweight and 19% are obese (The National Survey of Children's Health, 2012). Given that Texas rates mirror national rates and that Texas ranks among one of the most overweight states in the U.S., students in Texas were the focus of the current project.

Obesity Outcomes

Research indicates that children who are overweight are at a higher risk of cardiovascular disease risk factors than their normal weight counterparts (Freedman et al., 2009). Psychological health problems are also of concern among an overweight pediatric population. For instance, BeLue et al. (2009) found a higher reported rate of mental health problems in overweight adolescents compared to their normal-weight counterparts. Additionally, overweight and obese youth are also more likely to be overweight or obese as adults (Freedman et al., 2009; U.S. Surgeon General, 2001).

Obesity Determinants

While genetics may play a role in overweight status, the growing epidemic is likely due to lifestyle factors, such as eating and activity (Hill & Trowbridge, 1998; Weiting, 2008). An energy imbalance can result from eating more calories than one expends over a long period of time, leading to weight gain (CDC, 2009). The Institute of Medicine has identified possible dietary-related explanations for this imbalance among children, which

include: abundance of larger portion sizes, increased intake of meals outside of the home, high rates of energy-dense foods, and consumption of sugar-sweetened beverages (SSBs) (IOM, 2005). Foods that contain refined grains, and have added sugar and fat, are readily available, and tend to cost less than and may replace healthier options (Drewnowski, 2007). In addition, characteristics of calorically-dense foods, such as high palatability, may have addictive properties (Barry, Clarke, & Petry, 2009).

Trends in food availability align with these possible explanations. Specifically, increases in oils, shortening, meat, cheese, frozen desserts, and added sweeteners (primarily used in carbonated beverages) from 1909 to 2007 have been noted (Barnard, 2010). Barnard acknowledges that these trends are tied to driving factors such as more meals acquired away from home and from commercial settings, increased advertising of these products, and increased availability of these products in schools. A recent study of possible dietary patterns that explain childhood obesity found that an energy-dense diet that is high in fat and low in fiber (i.e., high amounts of chips, processed meat, low-fiber bread, and candy and low amounts of fruits and vegetables) was associated with greater fat mass and increased odds of having excess body fat (Johnson, Mander, Jones, Emmett, & Jebb, 2008). Recent estimates indicate that youth consumption of SSBs and 100% fruit juice have increased over time and may account for about 10-15% of daily calories (Wang, Bleich, & Gortmaker, 2008). Results from a randomized controlled trial showed that a nutrition education program was associated with a reduction in carbonated drinks consumed by students and a reduced number of overweight and obese students (James,

Thomas, Cavan, & Kerr, 2004). Dietary factors noted above, in combination with decreases in activity levels (Hills, King, & Armstrong, 2007) likely create a complex, synergistic effect, which ultimately increases weight status.

Advertising and Youth

Advertising is one factor related to dietary determinants of obesity that has been explored to a lesser degree. Youth purchasing power has increased significantly over time; children and adolescents represent a large segment of the population that has primarily discretionary income (usually from gifts, allowances, chores, and/or jobs) and will become the future's adult consumers (IOM, 2006). Estimates from 2005 show that children ages 3-11 years had a purchasing power of approximately 18 billion dollars (Packaged Facts, 2006). Results from a 2009 investment bank/asset management company study found that teens may spend $125 billion annually, with about 15% of that on food (Zmuda, 2009). Additionally, youth influence household purchases, especially decisions regarding food products and brands (Roper Youth Report, 2003). Estimates from 2005 show that children under 14 influenced up to 47% of household spending in the U.S., which translates to over 700 billion dollars (McNeal, 2006). This estimate accounts for $40 billion in children's individual spending, $340 billion in direct influencing, and $340 in indirect influence. Typical products marketed toward children include sugary cereals, fast food, toys, candy, gum, and games, which is reflected in youth purchasing trends.

Traditionally, television has been the primary source of advertising aimed at children for decades. Children may view over 40,000 total ads annually (Kunkel, 2001), and half of all ads during children's programming are for food (Kaiser Family Foundation, 2007). With the increasing prevalence of home digital recorders (e.g., TiVo), the consumer has the ability to avoid viewing unwanted advertising. However, marketers are creating new ways to promote products and may benefit from additional advertising outlets that reinforce messages seen on television or in print. Other modes of advertising include cable television, radio, magazines, books, the Internet, video games, and advergames (Internet-based interactive gaming that allows for commercial marketing and branding) (IOM, 2006). Youth are more accessible to marketers than ever with the abundance of cell phones, smart phones, laptops computers, and other portable electronic devices. New modes of communication allow marketers to employ novel methods, including texting, banner ads, interactive sites, and other online forms. In order for marketers to reach children and adolescents, they place advertisements and products in places where children spend time, such as sporting arenas, childcare settings, grocery stores, theaters, and schools (IOM, 2006).

Food and Beverage Advertising

Federal Trade Commission estimates show that about $1.8 billion was spent to promote food and beverage products to youth in 2009 (FTC, 2012). An examination of advertising in 2004 showed that children view over 5,000 food-related television advertisements annually (FTC, 2007) and, as compared to other outlets, 35% of the

money spent on youth-directed food and beverage marketing was spent on television promotions (FTC, 2012). However, food marketing geared toward youth has increased in channels other than television, with recent estimates showing that the majority of food advertising dollars to target children were spent on channels other than traditional television ads (FTC, 2012). For instance, approximately $123 million was allocated to new media outlets such as digital, company websites, Internet, word-of-mouth, and viral (FTC, 2012).

Food advertising that targets youth contributes to overweight among children because of the poor quality foods that are typically advertised (Holt, Ippolito, Desrochers, & Kelley, 2007; Powell, Szczpka, Chaloupka, & Braunschweig, 2007). About $1.29 billion, or 72% of total dollars spent on youth food and beverage promotion, was spent on promotion of quick-serve restaurant food (e.g., McDonald's, Jack in the Box, Chick-fil-A), carbonated beverages, and breakfast cereals (FTC, 2012). Powell and colleagues examined advertisements aired on top-rated children's shows over a 9-month period. They conducted a nutritional assessment of all food advertisements and reported that about 98% of those viewed by children ages 2-11 were for products high in sugar, fat, or sodium (Powell et al., 2007). An examination of child television advertising exposure trends from 1977 to 2004 concluded that, while some food category advertisements declined, advertisements for snacks, fast food, and other restaurants viewed by children increased over time (Holt et al., 2007).

Promotional tactics, such as athletic sponsorships, celebrity endorsements, product

placements, and video game advertising accounts for about 18% ($315 million) of total youth-directed marketing (FTC, 2012). Cross-promotions (including product tie-ins with licensed characters, movies, and toys) account for about 5% (or $80.6 million) of youth-directed food marketing, however this is likely an underestimate, as many companies report paying no fees for such promotions (FTC, 2012). Companies strategically use specific marketing tactics (like those listed above) to appeal to kids. For instance, familiar songs may help kids remember certain products or increase their perception of product quality (Schor, 2004). Branded spokescharacters (e.g., Tony the Tiger, Toucan Sam, Count Chocula, Ronald McDonald) and familiar movie, television, and/or comic characters are often used in children's advertising as a way to build brand awareness and loyalty (IOM, 2006). The inclusion of child actors and celebrity endorsers, premium offers (e.g., giveaways, discounted purchasing opportunities), and cross-promotions (e.g., tie-ins between fast food restaurants and movies) are common marketing appeals used to target youth. An examination of advertising geared towards children illuminates the various persuasive techniques used by marketers. Product taste was the appeal in 34% of all ads viewed, 18% of ads promoted a product as fun, 16% included premiums or contests associated with the product, and 10% indicated the product was new or unique (Kaiser Family Foundation, 2007).

Previous research has focused on the effect of food and beverage promotion on children's food decisions. Specifically, exposure to food advertisements has been positively and significantly associated with energy intake in children (Halford, Gillespie,

Brown, Pontin, & Dovey, 2004; Halford et al., 2007) and with higher obesity rates among youth (Chou, Rashad, & Grossman, 2008). Halford and colleagues found that exposure to food advertisements resulted in significant increases in overall energy intake among a sample of 93 children, regardless of individual weight status (Halford et al., 2007). These same researchers found similar results with a sample of older children (mean age 10 years), although post-advertisement consumption was highest among overweight children (Halford et al., 2004). While food advertising geared toward all children regardless of weight status is an area of concern, the Halford et al. study results are particularly disconcerting given the high rates of children who are currently obese. These individuals could potentially be more susceptible to the negative aspects of food advertising, perhaps due to deliberate tactics used by advertisers. For instance, the children displayed in commercials may exhibit characteristics and behaviors that are appealing, such as having fun, enjoying time with friends, and having appealing physical features. It is possible that overweight individuals connect consumption of the advertised product with these positive traits. On the other hand, overweight youth may experience dissonance between themselves and the youth displayed in advertisements, leading them to eat in response to any negative feelings.

Recent research has examined longitudinal data to predict a possible causal relationship between fast food television advertising and obesity rates. While causation cannot be definitively surmised, results indicated a strong positive effect of exposure to fast food restaurant advertising and the probability that children have higher rates of

obesity (Chou et al., 2008). These results reflect the conclusions of a comprehensive review conducted by the IOM, in that children's exposure to television advertising affects their choices of and preferences for certain types of foods (IOM, 2006).

In-School Food and Beverage Promotion

In 2009, a staggering $1.79 billion was spent on food and beverage marketing aimed at youth, and $149 million (8.3% of all food marketing directed at youth) was allocated to advertising in schools (FTC, 2012). The majority of in-school marketing expenditures (93%) were for carbonated ($82.3 million) and non-carbonated ($55.9 million) beverages, however this most recent report advises that these numbers are likely an underestimate. Schools provide an opportune location for food and beverage promotion, because companies can benefit from having a captive, target audience whose presence is required (Palmer et al., 2004). While children have the option to "change the channel" with television advertisements in the home, they may have a less active role in what they are subjected to in the school environment. Additionally, relative to other environments, schools are less cluttered with advertising that may compete for students' attention (Palmer et al., 2004). Schools may be motivated to allow advertising, because they are often compensated for collaboration with food companies, alleviating some of the budget constraints present in many districts (IOM, 2006). Therefore school officials may be motivated to work with food companies, despite potential negative outcomes on students due to presence of advertising in schools. Lower socioeconomic schools may be

more dependent on incentives provided by commercial food companies, which is especially alarming because of the disproportionate rates of obesity among this population (Palmer et al., 2004).

Promotion Channels in Schools

Food and beverage advertising in the school environment includes posters and other signage, vending machines, advertising in school newspapers, corporate-sponsored classroom activities and lessons (IOM, 2005), and food sales for fundraising (Caparosa et al., 2013). Specific examples are scoreboard advertising, gym banners, ads in school newspapers and yearbooks, textbook covers, screen savers on school computers, and athletic warm-up suits (Story & French, 2004). Some companies have developed lines of promotional and educational products intended for advertisers to place brand logos, which are dispersed to students for free (Story & French, 2004). This allows commercial food companies to more effectively market products in the school environment, while providing a direct incentive to schools. Channel One, a 12-minute current events program, is shown in approximately 38% of U.S. middle and high schools (General Accounting Office [GAO], 2000). Programming includes two minutes of commercials, 86% of which are for various food products like chips, soft drinks, and candy (GAO, 2000).

Competitive foods, those that are sold in direct competition with foods offered by the school lunch program, include products sold in vending machines, commercial food outlets (i.e., Taco Bell and Pizza Hut), snack bars, a la carte lines, and fundraising events.

Cross-sectional data from the 2005 School Nutrition and Dietary Assessment study that included a nationally representative sample of 395 US public schools show that approximately 17% of elementary, 82% of middle, and 97% high schools had vending machines (Finkelstein, Hill, & Whitaker, 2008). Additionally, a la carte items were available in 71% of elementary, 92% of middle, and 93% of high schools, and items sold in vending machines and a la carte lines were predominantly energy-dense and nutrient-low (Finkelstein et al., 2008). While competitive foods may provide additional, much-needed money for schools, they represent another channel for food marketing, provide an opportunity for children to purchase and consume high-calorie, low-nutrient foods, and are likely contributing to the childhood obesity epidemic (IOM, 2006). Food that is promoted in schools appears to conflict with and may negate nutrition education taught in the same environment. A U.S. Department of Agriculture (USDA) report acknowledged this, listing it as a top concern about competitive foods in the school (USDA, 2001).

The Commercialism in Education Research Unit at Arizona State University conducted a national survey of U.S. public school officials to determine the types and prevalence of advertising in schools. Additionally, the amount of money earned from advertising and how school programs would be affected if this advertising were eliminated, and attitudes regarding school advertising regulation, were assessed. Findings from this study for the 2003-2004 academic year indicated that 33-37 million students of the over 42 million students who were in attendance were exposed to corporate advertising, with estimates of about 27-30 million students exposed to advertising of

foods of minimal nutritional value (FMNV) (Molnar, Garcia, Boninger, & Merrill, 2006). Approximately 83% of schools had corporate advertising, 67% had corporate advertising of FMNV, and 43% had corporate fundraising programs that sold FMNV. Seventy-three percent of schools reported no income received from activities with corporations promoting FMNV, and 69% of officials support regulation of advertising of FMNV.

The California (CA) Project LEAN was undertaken in 2006 to examine food and beverage marketing in 20 high schools in California (Craypo, Stone Francisco, Boyle, & Samuels, 2006). A tool was developed to assess aspects of the school environment, including advertisements throughout the school, electronic advertising (i.e., Channel One), marketing events (e.g., product give-aways, coupons), and presence of corporate-sponsored programs. A total of 245 advertisements were found across all schools, with over half displaying less healthy products. Results show that 13 of the 20 schools had food and beverage advertising in cafeterias, 9 schools displayed ads on scoreboards, and 8 schools had ads in classrooms. Vending machines were prevalent; a total of 276 were found across all campuses, with an average of 15 machines per school. Commercial brand logos were found most commonly on food/beverage coolers and display cases, followed by cups and napkins, and school supplies. Other outlets for food and beverage marketing that were noted included yearbooks, audio channels (e.g., radio, PA system), and newspapers. Additionally, 7 schools had product give-aways, 5 had coupon giveaways, and almost half of the schools reported receiving support from food/beverage companies for activities (e.g., athletics, clubs, social events). Moreover, the

overwhelming majority (93%) of these activities were supported by companies selling predominantly unhealthy foods and beverages, such as soda and fast food. A strength of the CA Project LEAN study is the development of an assessment tool, however data have not been published regarding the tool's development, reliability, or validity. The tool is a paper/pencil measure and relies on school staff reports about food and beverage marketing, and the study included only a small number of high schools.

In, 2007 a pilot study to assess the extent and nature of in-school food and beverage promotion in schools in Montgomery County, Maryland was conducted (Center for Science in the Public Interest [CSPI], 2008). An adapted version of an assessment tool was used (Craypo et al., 2006), and school staff from 36 public schools, including six middle schools, provided the data. Posters or signs depicting food and beverage company logos or products were found in 100% of the middle schools and were visible on scoreboards, walls, bulletin boards, throughout schools buildings. Types of foods on posters and signs varied by location, with prepared/packaged food, dairy products, and nutrition education promoted in cafeterias, soda and sports drinks in gyms, and prepared foods, snacks, soda and snacks in snack bars and classrooms. All six middle schools had vending machines present that promoted foods and beverages through products depictions and brand logos. Food and beverage marketing on the exterior of vending machines consisted primarily of snacks, juice/juice drinks, and soda images and/or logos, and almost half of them depicted low-nutrient products. On vending machine exteriors, the most commonly marketed brands were Pepsi and Coca-Cola. Among others, products

advertised on school vending machines that are associated with these brands included Minute Maid, Gatorade, Dasani, Tropicana, Aquafina, Nesquik, Hershey's, and Good Humor. While these data provide some information about the school environment, limitations are that the data were not collected by an objective source outside of school staff and there were only a small number of middle schools that were assessed.

As part of a larger inventory of high school food environments in Maine to assess the effect of a statewide nutrition policy banning FMNV, Whatley Blum and colleagues collected, among other data, observational data about soda advertisements in cafeterias, on vending machines, and in school buildings (Whatley Blum et al., 2011). Researchers randomly selected 11 schools from different counties in Maine, where a team of two collected inventory data on the availability of FMNV. Details regarding the criteria for advertisements were not explicitly stated, however, results showed that 10 schools had soda advertisements, primarily on scoreboards, and one school advertised candy.

In-School Promotion of Foods and Beverages: Availability of Foods and Beverages

Most research regarding the presence of foods and beverages in schools has focused on the availability and accessibility of competitive foods (e.g., a la carte lines, vending machines, school stores) and school lunch programs and students' weight status, food choices, preferences, and purchasing behavior. The availability of snacks and drinks sold in schools has been associated with higher student intake of total calories, total and saturated fat, and soft drinks, and with lower intake of milk, fruits and vegetables, and vital nutrients (e.g., Cullen, Eagan, Baranowski, Owens, & de Moor 2000; Cullen &

Zakeri, 2004; Cullen & Thompson, 2005; Kubik, Lytle, Hannan, Perry, & Story, 2003). Other research suggests that restrictions on unhealthy competitive foods in schools may decrease middle- and high school students' daily intake of these foods at school (e.g., Cullen & Zakeri, 2004; Cullen, Watson, Zakeri, & Ralston, 2006; Hartstein et al., 2008; Neumark-Sztainer, French, Hannan, Story, & Fulkerson, 2005; Rovner, Nansel, Wang, & Iannotti, 2011). Additionally, qualitative data show that elementary children view a high number of unhealthy foods available in school stores as a barrier to healthy eating at school (Hesketh et al., 2005).

Overall, these results suggest the potential detriment of students' exposure to food and beverage promotion via snack bars. In addition to providing direct competition with the National School Lunch Program (NSLP) meals, these types of food venues in schools often display and advertise commercial products. Competitive foods (i.e., commercial products such as chips, sodas, candy) may represent a form of advertising through logos and packaging, which may reinforce brand recognition and influence consumption of these products in- and out of school. Students' exposure to foods in school likely influences their preferences and choices outside of school, thus making changes to reflect a healthier school environment could help shape eating habits in other environments. It is possible that students may consume unhealthy foods less often if the school environment does not appear to advocate for this behavior.

In School Promotion of Foods and Beverages: Associations with Weight-Related Outcomes

While previous research points to the potentially detrimental effects of the availability of competitive foods in schools, few studies have looked specifically at the potential influence of food and beverage promotion in schools, either through traditional channels (e.g., posters, signs) or through products as a form of promotion (e.g., presence of logos). It is possible that students choose unhealthy competitive foods more often, in- and out of school, because they are surrounded by commercial products on a regular basis in the school environment that may be influential in similar ways as traditional advertising. The omnipresence of commercial products may create a norm that promotes the acceptance of certain foods and beverages, thus students may choose these more often whether or not they are conscious of the products' presence in their environment. This section is a review of the literature regarding the existence of in-school food and beverage marketing and associations with nutrition- and weight-related outcomes.

Probart and colleagues looked at the existence, locations, and prevalence of soft drink advertisements in over 200 Pennsylvania high schools (Probart, McDonnell, Bailey-Davis, & Weirich, 2006). Food service directors completed surveys that assessed information about the schools' food service programs, vending machine access, and average daily school lunch participation. Specifically, participants indicated the existence of a pouring-rights contract, average daily lunch participation, incentives from soft drink companies, Channel One subscriptions, time of the first lunch period, locations of soft drink advertisements, and the extent of access to vending machines. About 63% of schools had soft drink machines owned by a commercial company that provided funding

to the school based on revenue percentage, and 48.5% of schools had an exclusive pouring-rights contract with a soft drink bottler. Sixty-two percent of respondents reported soft drink advertisements were present on vending machines. Twenty-seven percent of soft drink advertisements were reported on school grounds (i.e., playing fields), 10.6% were in cafeterias, and 9.3% were in other areas of the school building. The majority of respondents (66.5%) indicated that soft drink advertisements existed in at least one location in the school. Average daily lunch participation was significantly and inversely associated with the number of advertisement locations, indicating that higher number of advertisement locations, the lower level of average daily participation. Results from this study indicate that soft drink advertising is prevalent in high schools and may be contributing to lower National School Lunch Program participation. This is potentially problematic, given the positive associations of exposure to advertising and food preferences among youth (IOM, 2006) and the association of school lunch participation and higher fruit and vegetable consumption (Cullen et al., 2000). This study provides a picture of the food environment in high schools, however limitations include the potentially biased self-report from food service workers about what is present in the school environment and the lack of student-level data to examine possible associations between the in-school food and beverage promotion environment and individual level factors such as BMI or dietary choices.

Delva, O'Malley, & Johnston (2007) conducted analyses from cross-sectional survey data provided by over 13,000 8th grade students from 126 different schools in the

years 2004 and 2005. School administrators or food service workers reported on policies regarding pouring contracts and the availability of foods and beverages in school in vending machines, a la carte lines, and the school lunch program. Specific items were used to measure the availability of commercial items, such as Pizza Hut and Taco Bell, and the availability and accessibility of healthier (e.g., low-fat salty snack, baked goods, ice cream/frozen yogurt, fruits/vegetables) and less-healthy snacks (e.g., candy, salty snacks, baked goods, ice cream/frozen yogurt not low in fat). Among 8th grades (middle schools) brand-name fast food was offered, on average, 0.8 times a week in a la carte lines and 0.6 times a week in school lunch meals. Healthy foods were offered in vending machines, school stores, or snack bars in approximately 40 to 60% of schools (low-fat baked goods (41%), low-fat salty snacks (56%), fruits/vegetables (60%)). Similarly, a large percentage of schools also offered unhealthy foods in vending machines, school stores, and/or snack bars (candy (44%), salty snacks not low in fat (61%), baked goods not low in fat (66%), ice cream/frozen yogurt not low in fat (46%)). Brand-name fast food and products offered in vending machines and snack bars may represent outlets for commercial advertising of predominantly unhealthy food items in school, which likely influences students' food choices and weight-related outcomes.

Mazur et al. (2008) explored the impact of food advertising in schools on food-shop purchases in a sample of about 15,000 primary and secondary students in Poland. In forty-four schools, researchers collected data from food service workers on student food purchases in school shops for the preceding week. The types of foods displayed in the

shop were documented and categorized as "healthy" (those recommended by the U.S. Department of Agriculture's My Pyramid) or "unhealthy." These food types were then placed into categories based on if they were advertised and/or purchased in the school. Additionally, project staff documented any direct corporate advertising present in the school. More than half of the schools did not offer any type of "healthy" food in the school food shop and, in the shops that did offer "healthy" foods, sales of these types of foods were low. Significant correlations between advertisement of a specific food and purchasing of the specific product were found. There was no significant difference in purchasing behavior and location of advertisements (near the food shop versus elsewhere on campus) and no commercial advertisements for "healthy" foods were found in any school. These results suggest that any advertising for and availability of "unhealthy" foods in schools are likely contributors to student purchases of the same type of foods. Strengths of this study include the direct documentation of the school environment by research staff, rather than relying on the potentially biased opinion of school administrators or food service workers, the documentation of direct commercial advertising in schools, the categorizations of healthy and unhealthy foods, and the use of primary and secondary schools. However, it is limited by the single student-level measure of school store purchases.

A recent examination of cross-sectional data on school food environment characteristics and student dietary behavior from 287 schools in seven different U.S. geographical regions point to the potential negative effects of certain in-school offerings

(Briefel, Crepinsek, Cabili, Wilson, & Gleason, 2009). The school environment was measured through surveys of principals and food service employees, lunch menus, and on-site observations. Child dietary behavior was measured by self-reported consumption of the following: low-nutrient energy-dense foods, sugar-sweetened beverages, and fruits and vegetables. The authors hypothesized that a healthier school food environment (i.e., limited access to competitive foods, healthy school lunches, promotion of healthy eating) would be associated with healthier in-school dietary behavior among students (i.e., consumption of less energy from low-nutrient energy-dense foods, sugar-sweetened beverages, and more fruits and vegetables). Results for over 2,300 students in grades one through 12 showed that attending a school without snack bars significantly reduced kilocalorie intake from sugar-sweetened beverages in middle- and high school students by 22 and 28 kcal/day, respectively. Significantly less energy came from sugar-sweetened beverages among students who attended middle schools with no pouring rights contract (16 kcal/day), a la carte lines without low-nutrient energy-dense items (26 kcal/day), and no a la carte lines (52 kcal/day). Elementary school children's daily intake of vegetables (other than French fries) was significantly associated with offering fresh fruits and vegetables and the absence of French fry offerings. Similarly, a significant and positive relationship was found between the absence of low-nutrient, energy-dense foods in a la carte lines and vegetable intake (excluding French fries) among middle-school students. Surprisingly, Briefel and colleagues (2009) did not find a significant association between restricted access to vending machines and sugar-sweetened beverage

consumption among middle school students. Overall, study results indicate that students who are not exposed to low-nutrient energy-dense foods in school may be less likely to consume similar types of food and may be more likely to consume healthier options. This study is strengthened by the use of measures at multiple levels (i.e., direct observations, administration- and student-reports) to gain a better understanding of the school environment, however a limitation is the lack of data collected regarding direct commercial advertising.

Kubik, Lytle, and Story (2005) examined school food practices and their association with students' BMI in over 3,000 eighth-graders in Minnesota. Specifically, administrator-reported school food use policies and student BMI were examined. If food or food coupons were used as an incentive for students and if foods were sold in classroom and/or school-wide fundraising were are examples of school food policies that were included. Multivariate analyses showed that a 10% increase in student BMI resulted for every additional permissible in-school food practice. A positive association between school fundraising and classroom rewards and students' obesity-related outcomes is alarming, given that foods and beverages promoted in these outlets is prevalent.

Minaker et al. (2011) conducted a study that examined associations between the school food environment, specifically vending machine availability and the presence of food/beverage logos, and Canadian students' BMI and food behaviors. Participants were 4,036 students in grades 7-10 (mean age=13.6 years) from 136 schools and 44 districts

who self-reported height/weight and diet and physical activity behaviors through the Web-Survey of Physical Activity and Nutrition (Web-SPAN). Students were also asked if snack and beverage vending machines and logos were present in their school, with response options of "yes," "no," or "don't know." Nutrition-related questions included items that asked how often they consumed meals away from home, specifying locations such as vending machines, with response options ranging from "rarely or never" to "once a day." A Food Frequency Questionnaire item that asked "How often do you eat or drink these foods?" was used to assess the frequency of candy, chocolate, soft drinks, and salty snacks, with response options ranging from "rarely or never" to "at least 2 times a day." Descriptive statistics and multinomial logistic regression models were run to determine the prevalence of vending machines and logs, and the association of vending machine and/or presence and the probability of students being overweight, frequency of consumption of foods from vending machines, and diet quality. Analyses to determine if dietary behaviors attenuated any associations between the school environment and weight were also conducted. The majority of students reported the presence of snack and/or beverage vending machines in their school. About 40% of participants reported snack logo presence and 57% reported beverage logo presence in their schools. Students who reported the presence of beverage vending machines had a 27% greater likelihood of being overweight or obese, compared with students who reported no beverage vending machines. Interestingly, this relationship was not explained by students' consumption of items from vending machines, or overall soda or sugar consumption, presence of snack

vending machines, or snack or beverage logo presence. Students who indicated the presence of snack and/or beverage logos in school were significantly more likely to consume snacks from a vending machine than students who reported no logos. The presence of snack logos was significantly associated with a higher likelihood of candy and salty snack consumption. The authors posit that the mere presence of vending machines in the school environment may imply that it is acceptable for students to consume items traditionally sold in vending machines, even if they are not purchasing these items in school. Additionally, they suggest that the finding that snack and beverage logo, but not vending machine, presence was associated with soda, salty snack, and candy consumption may reflect the effects of brand marketing in that logos oftentimes exist in areas of the school other than vending machines (e.g., logos on clocks or scoreboards, branded items that are available in a la carte lines).

Importance of In-School Promotion of Foods and Beverages

Given the numerous outlets for food promotion in schools, it is probable that children are exposed to multiple marketing campaigns through many channels. With increases in marketing in schools, students may become accustomed to a certain school "landscape," that includes advertising and availability of certain products. It is possible that they may begin to make purchasing decisions that are based on the constant promotion of products, even if they are not consciously processing the incoming advertising information. Additionally, in-school product promotion may be all the more persuasive, since previous qualitative research shows that children may view things

promoted in the school environment as inherently healthy (Hesketh et al., 2005). Specifically, children may view unhealthy items available in schools as relatively healthy because of the environment in which they are promoted, despite contradictions with school-based nutrition education (Hesketh et al., 2005) and may associate certain products with the power and prestige of school officials, teachers, or coaches (Palmer et al., 2004).

The majority of U.S children are enrolled in public or private schools and spend a significant portion of the day there. Food eaten in the school environment may account for 19-50% of students' daily caloric intake (Gleason & Suitor, 2001). Additionally, youth form food-related behaviors at school, which are influenced by individual developmental stage (IOM, 2005), peers (Birch, 1980), and food availability (French et al., 2001). Childhood eating habits likely persist into adulthood (Birch, 1999), thus it is critical to provide a supportive eating environment in schools to positively influence development of students' food-related behavior.

Theoretical Background

Given previous research regarding food and beverage advertising and consumption choices and preferences among children, it is necessary to investigate possible theoretical explanations for these relationships. The following section will discuss how advertising may be particularly influential for youth and several theoretical models, which will inform the research questions developed for this dissertation.

Advertising and Cognitive Development

Theories about the levels of child cognition in relation to advertising have been postulated. Previous research shows that children under the age of eight are likely unable to understand the intent of advertisements and thus may not determine the persuasive nature of commercials (Robertson & Rossiter, 1974). John expanded upon the works of Piaget and Selman and proposed three stages of consumer socialization (John, 1999). From age three to seven years, or the perceptual stage, children are unable to act as informed consumers because of their one-dimensional focus on objects and events. As children move to the analytical stage, approximately age seven to eleven, they are better able to analyze multi-dimensions of objects and events at one time, which improves their ability to make informed consumption decisions. Around age eleven to sixteen, or the reflective stage, youth may have an advanced understanding of advertising techniques and intent.

Although there are benefits to an increased ability to think abstractly, Pechman and colleagues assert that adolescents may feel self-conscious and have heightened social anxiety due to the inability to effectively cope with feelings associated with abstract thinking, which leaves adolescents particularly vulnerable to advertisers' messages (Pechman, Levine, Loughlin, & Leslie, 2005). Specifically, Solomon (1983) proposes the symbolic interactionism theory, which indicates that consumers may buy products based on beliefs about the consumption symbolism (such as the positive image it portrays). In turn, this may contribute to consumers' perception of increased self-worth. Interestingly, this theory posits that individuals may rely more on consumption symbols during periods

of transition, such as adolescence, in order to convey to themselves and others that a desired status will eventually be attained. Thus, adolescents may be more susceptible to images in advertising due to feelings of self-doubt and the need to reflect positive images attributed to consuming certain products (Pechman et al., 2005).

Although children of a certain age may be able to more clearly see advertising intent, preferences for certain products and companies (i.e., brand loyalty) may have been established early on. Additionally, awareness of advertising intent is not necessarily enough to prevent children and adolescents from wanting or purchasing a product; repeated exposure to messages that promote "fun" products can influence young consumers despite their knowledge of the seller's intent to persuade (Rossiter & Robertson, 1974).

Elaboration Likelihood Model

The Elaboration Likelihood Model (ELM) posits that people form attitudes on an analysis continuum, with central and peripheral routes at either end (Petty et al., 2005). Central cognitive processing entails careful examination (or elaboration) of pertinent aspects of a topic, while the peripheral route involves less effort and scrutiny. Reliance on simple cues for persuasion, such as message length, message source attractiveness, or product packaging is one aspect of peripheral processing. For the most part, food-related decisions do not require the depth of processing that other consumption decisions may. For instance, it is unlikely that an individual would weigh the merits of a breakfast cereal in the same way they would when deciding which car to buy.

According to ELM, attitudes formed via the peripheral route are "less accessible, persistent, resistant, and predictive of behavior than are attitudes formed through a central route," (Petty et al., 2005; p. 86). However, there is evidence that even if children rely on the peripheral route to process advertising messages and form attitudes, they can still be highly affected (Harris et al., 2009). Additionally, commercial food companies have devoted large amounts of money to forms of marketing designed specifically to avoid active, deliberate processing of persuasive messages (Eisenberg, McDowell, Berestein, Tsiantar, & Finan, 2002). Furthermore, it is potentially inconsequential that attitudes formed in this way may not be persistent over time (Petty et al., 2005), as children can make *immediate* food-related decisions in response to food ads since many products advertised are also readily available, such as in the school environment.

In alignment with ELM, an individual must be motivated and able to process the persuasive message; if the person is not, peripheral processing of the message is more likely to occur (Petty et al., 2005). Motivation may be affected by the amount of cues in the environment; an overwhelming number of environmental cues could inhibit the ability of individuals to engage in central route processing for all messages (especially those that are of less personal relevance). Given the abundance of food marketing, common components of advertising for food aimed at youth (IOM, 2006), and a child's lack of cognitive development (John, 1999), peripheral processing of food advertisements is almost certain.

The peripheral processing route construct from the ELM appears to be a necessary

component of a theoretical framework to help understand effects of advertising exposure and kids' food-related decisions. Children likely engage in peripheral processing of advertisements for unhealthy food in the school environment. Simple cues in these advertisements (e.g., bright colors or models who appear to be having fun) may trigger positive attitudes for students, which could increase the likelihood that they will choose an unhealthy food that is the same or similar to the one present in the ad.

Effect of Exposure

The Mere Exposure Effect is a phenomenon where individuals prefer stimuli that they have been exposed to numerous times over one that they have only experienced once (Harrison, 1977). This effect has been observed in laboratory settings (Monahan, Murphy, & Zajonc, 2000; Bornstein, 1989). Harris et al. (2009) suggest that preference for certain food items may develop from repeated exposure to products/messages, even if the consumer is unaware (i.e., driving by fast food outlets, walking through the grocery store, brand logos in schools).

In a sample of over 250 children ages 5-8 enrolled in a summer camp, researchers found an effect on children's food and drink selections after repeated exposure to food messages (Gorn & Goldberg, 1982). Participants were exposed to 4.5 minutes of 30-second food commercials during a 30-minute cartoon each day for 14 days. Children who were exposed to messages about sweets (i.e., Kool Aid and candy) were less likely to choose fruit and fruit juice than those exposed to messages about fruit and yogurt.

Other research has shown that children who are exposed to food marketing are more likely to prefer advertised items immediately following ad exposure, possibly due to a dose-response of exposure a child has to food advertisements. In a randomized controlled trial, Borzekowski and Robinson (2001) found that children ages 2-6 enrolled in a California Head Start program were significantly more likely to select foods after exposure to more than one commercial for the product. Goldberg and colleagues examined first graders' preferences for snack and breakfast foods immediately following exposure to ads for these products. Participants who viewed ads for high-sugar foods preferred these; those that viewed public service announcements for healthier foods preferred healthier foods (Goldberg et al., 1978).

An experiment was conducted to examine the effect of television commercial viewing and subsequent purchase influencing attempts (requests for an item, purchasing or choosing an item) made at a supermarket (Galst & White, 1976). Results showed that young children (mean age 4 years and 7 months) who had higher levels of television program and commercial viewings also had more post-viewing purchase-influencing attempts. Candy and cereal, the most heavily advertised items, were also requested or purchased most at the supermarket.

Other researchers conducted an experiment with 5th and 6th grade students in an Australian school, examining associations between children's television viewing habits and attitudes and behavior related to food. They found a positive relationship between advertising exposure and attitudes and beliefs regarding food and assert that attitudes and

beliefs may mediate the relationship between advertising exposure and eating behavior (Dixon, Scully, Wakefield, White, & Crawford, 2007).

To date, the literature has focused mainly on children's overall advertising exposure (i.e., across contexts, cumulative exposure over time, etc.) and/or has examined the issue of exposure through experiments that are not specifically geared toward advertising exposure in school. An extension of existing research related to the current dissertation, is that the amount of advertising exposure a child is subjected to in the school environment may affect the relationship between advertising viewing and food consumption in the same environment. Specifically, this relationship is influenced via change in attitudes and preferences for the advertised product. Children who have more exposure to unhealthy food promotions in school may have more positive attitudes of the foods, prefer and choose them more often.

Priming

Priming refers to automatic responses that occur outside of intention or awareness, and may not necessarily reflect attitudes or beliefs. Automatic attitudes are hypothesized to develop through repeated pairings of objects or persons with emotions, motivations, situations, and other objects (Baron & Banaji, 2006; Rudman, 2004). Priming effects have been noted with behaviors such as aggression, rudeness, and walking speed (Dijksterhuis, Chartrand, & Aarts, 2007). Dunn & Yniguez (1999) found that television programs and advertising have priming effects on children's positive expectancies of alcohol consumption.

Wansink (2006) demonstrated that consumption behavior may occur through automatic processes, without the consumer's awareness. Sensory cues related to food, such as those that are often provided in advertising (i.e., "hot" and "moist"), can increase consumption (Ferriday & Brunstrom, 2008), even when an individual is not hungry (Cornell, Rodin, & Weingarten, 1989). A recent investigation of food advertising as a source of priming in children has shown similar results. Harris et al. (2009) found that children ate almost nine additional kilocalories more during a 14- minute exposure to television with food advertisements that promoted a "fun and happiness message." This is more salient when discussed in the terms of weight gain over time. The authors predict that, at this rate of consumption, with only 30 minutes a day of similar TV viewing without subsequent calorie compensation (i.e., decreased energy intake or increased energy output), a child could gain ten pounds a year.

Another study found that individuals drank more of a beverage after exposure to images of smiling faces than they did after viewing images of angry faces, but did not report a change in their own mood state (Winkielman, Berridge, & Wilbarger, 2005). Pervasive advertising that exists today may set in motion a constant priming effect, leading to children's unconscious overconsumption of unhealthy foods. It is possible that priming occurs through food advertising for unhealthy foods in the school environment, which could lead to an automatic increased consumption of these foods, irrespective of a conscious change in attitude or preference for the foods.

Social Cognitive Theory - Environment

Interactions with and observations of others in the immediate environment where advertising is presented can influence child's unconscious response. Bandura proposes a theoretical model in which the individual, environment, and behavior interact with and affect each other, creating reciprocal determinism (Bandura, 1986). The environment is anything external to the person and may encompass physical and social aspects. Physical components of the school environment related to the current proposed framework include the availability of unhealthy foods and presence of advertising that promotes these. The social environment in the school is comprised of peers, teachers, and other staff.

Children may choose unhealthy food items due to modeling of the behavior by peers or actors portrayed in food marketing. Birch (1980) conducted an experiment with preschool children examining the effects of peers on individual food choice, consumption and preference. Over a period of four days, there was a significant shift in children choosing non-preferred vegetables over preferred vegetables after observing peers choose the observer's non-preferred food. This pattern was also further observed in results, in that kids consumed and preferred foods that they originally did not prefer after exposure to peers who did prefer them. While these results have positive implications for promotion of healthy eating among children, they may also point to deleterious effects of children observing peers selecting low nutrient foods. Although this was a controlled experiment, results may represent real-world phenomena.

Duncker (1938) tested the effects of social influence on children's food choice and found that younger children were more likely to imitate the choices of older peers,

but not adults. The author posits that relative age and peer-identification swayed the children's food choices. Child actors in food advertising may be especially influential on youth consumption, because children may mimic food-related behaviors of others they identify with and actors are typically portrayed as having fun and enjoying the advertised product.

Additionally, presence of food marketing in school, independent of peer or actor modeling, could influence students' consumption behaviors. Palmer et al. (2004) propose that products promoted in school may be associated with power and prestige of school officials, teachers, and staff. Prestige of a message's source may increase persuasiveness of message (Hass, 1981).

Based on the theories discussed as well as previous study findings related to the potential effects of advertising on youth food and beverage choices and other health-related outcomes, the current dissertation study is proposed.

2.2 Current Study

To date, most of the research conducted on food advertising has focused on television advertising. While the negative effects of television advertisements on youth food and beverage choices and weight-related outcomes are well documented (e.g., Chou et al., 2008; Halford et al., 2004; Halford et al., 2007; Risvas, Panagiotakos, & Zampelas, 2008), a paucity of research exists on in-school marketing. Most in-school food and beverage promotion studies have examined the presence of competitive foods, school

lunch programs, and students' food purchases and choices, and results support a link between children's exposure to certain foods and beverages in school environment and the likelihood that they will choose similar products. Additionally, most studies of the school food environment have relied on food service worker, principal, or teacher reports (e.g., Probart et al., 2006), which may be biased. There is a lack of school-based research, particularly in middle schools, that focuses on the objective presence of food and beverage promotion in the form of traditional advertising (e.g., through signs) and actual products (e.g., commercial logos). Due to the amount of time children spend in school and the use of schools to advertise and promote food, it is necessary to further examine food and beverage promotions in this environment.

For this dissertation, the prevalence and type of food and beverage promotion in the middle school environment were examined by conducting secondary data analyses with previously collected direct observations of food- and beverage-related signage and products within 30 middle schools in Central Texas. A new measurement tool was used to collect all school-level data, thus the intra- and inter-rater reliability of this new instrument was also assessed. Data based on direct observations of food advertising in high-traffic areas of schools (i.e., cafeteria, gym, and major hallways) were coded for content and type.

Research Questions

Research questions include the following: 1) Is a new tool to measure the in-school environment related to food/beverage and physical activity promotion a reliable

instrument? 2) What types of food and beverage promotions may be found in the middle school environment? 3) How prevalent are healthy and unhealthy food and beverage promotions in the middle school environment? 4) What is the proportion of healthy and unhealthy food/beverage promotions in middle schools? 5) Do types and prevalence of food/beverage promotions in schools vary by school-level economic disadvantage and percent minority?

Chapter 3

Background and Methods for Dissertation Sub-Studies

3.1 CATCH Background

The Coordinated Approach To Child Health (CATCH) is an evidence-based school health program designed to increase healthy eating and physical activity, and to decrease tobacco use among elementary and middle school children (Coleman et al., 2005; Hoelscher et al., 2010; Leupker et al., 1996; Nader et al., 1999; Springer et al., 2012). The coordinated approach aims to decrease childhood obesity prevalence by promoting healthy behaviors among students, teachers and other school staff, and parents. The program is implemented at multiple levels of the environment, including classroom, cafeteria, physical education class, and home, in an attempt to provide a comprehensive approach to child health promotion.

CATCH schools are provided with promotional materials, including a CATCH banner and various posters, to hang in the school. These materials display messages and graphics that support the overall CATCH message to eat healthy and be physically active. Schools are encouraged to display information provided by other organizations that promote similar messages. In 2007, the Travis County CATCH team began developing a method to document implementation of signs in elementary schools. The goal was to assess dissemination of the promotional material and the relationship between signs and

other health outcomes, such as food and beverage consumption, physical activity levels, and overweight prevalence. Subsequently, the Central Texas CATCH Middle School Project (Springer et al., 2012) began, which included a similar dissemination assessment piece. However, state policies for products that can be sold and promoted in middle schools were more lenient than those for elementary schools. It was clear that the extent and type of food and beverage signage in middle schools differed from elementary, thus the method to document this part of the school environment needed to be altered for the middle school project.

The "School Health Promotion Signage Observation Checklist" was developed by the CATCH team, with the primary goals of collecting data of interest while minimizing time spent in schools. After several iterations, the resulting pencil and paper instrument would be used to document food/beverage and physical activity signage throughout the school. Details of each instance of food/beverage or physical activity promotion could be recorded, including the following:

1. where the message was located (main hall, gym, or cafeteria)
2. if the message was direct (encouraging or directing people to action, providing them with knowledge concerning the main category, or visible commercial food logos) or passive (indirectly promoting something through images)
3. number of signs
4. sign size, (small, medium, or large)

5. if the sign was printed professionally (printed in color or on glossy paper) or non-professional (hand-made or of lesser quality)
6. if the sign was CATCH-branded
7. what type of the CATCH-specific sign (which included a list of all possible signs the CATCH program may have provided to the school)
8. if there was a CATCH bulletin board present
9. what the sign was promoting, in general (food, beverage, or physical activity)
10. the percentage of the sign that matched certain content areas (e.g., nutrition, physical activity, water, social marketing).
11. a brief description

Although the final version of the updated school observation tool had not yet been tested, the CATCH team felt that it would be a useful tool to assess middle school environments.

3.2 In-School MEDIA Study Background

The School Health Promotion Signage Observation Checklist was a valuable instrument to assess food/beverage and physical activity promotion in middle schools, however it had not yet been used in a full-scale project. The In-School MEDIA (Measuring and Evaluating the Determinants and Influence of Advertising) study is a project that aimed to document all food and beverage promotion in the school environment using direct observation tools. Specifically, we aimed to use the

pencil/paper version of the CATCH checklist to do the following: 1) collect pilot data in order to assess the feasibility and logistics for a larger study 2) use pilot data to develop an electronic tool, based on the original checklist, to use for a larger study 3) collect data on the prevalence, type, and content of all food and beverage promotion in 30 middle schools in Central Texas.

3.3 Pilot Study

Pilot Study Design and Schools

Direct observations of food, beverage, and physical activity promotion in schools were conducted for the pilot study in the fall of 2011. Five schools in central Texas (Table 1) were chosen for the pilot study by a CATCH team member, based on availability and the likelihood that the sample would provide an accurate and diverse picture of all the middle schools that would be used in the dissertation study.

Table 1: Descriptive Data for Pilot Schools (n=5)

Mean Level of Economic Disadvantage (average % on free/reduced lunch)	41.6
Ethnicity	
African-American	14.7%
Asian/Pacific Islander	4.2%
White	49.2%
Hispanic	31.3%
Mean number of students in each school (SD)	1041 (200)

Pilot Study Measures

For the pilot study, data collectors used the most recent version of a pencil/paper data collection tool developed by the CATCH study (described in the previous CATCH section and available in Appendix A). For each instance of food/beverage or activity promotion, the following things were noted: a brief description, number of signs, where it was located (hall, gym, or cafeteria), the size, (small, medium, or large), if it was direct or passive, and if it was professionally made. Additional categories were listed so that researchers could note the type of the CATCH-specific sign (if applicable) and the percentage of the sign (all signs, not only CATCH-specific) that matched certain content areas (e.g., nutrition, physical activity, water, social marketing). Because the tool did not delineate between signage and actual products, we freehanded this information in the description as we came across food/beverage products.

Pilot Study Methods

Two research team members conducted observations at each of the five schools, and data collection times ranged from approximately 20-75 minutes per school. First, both team members checked in with the main office and obtained a map of the school's interior. Both investigators worked together to methodically move through the school and identify food, beverage, and physical activity promotion in the main hallways, gym, and cafeteria at each school. As promotion was identified, the researchers would discuss

categorization, description, and other pertinent details. One person took a picture and the other recorded information with pencil and paper.

Pilot Study Analyses

From school-level data provided by the CATCH team, descriptive demographic analyses were run for the five pilot schools. Food, beverage, and activity promotion instances were first categorized as either a sign (e.g., posters) or item (actual product), and then as healthy or unhealthy according to CATCH Go, Slow, Whoa criteria (Table 2). Frequencies of each category were determined. Descriptions of many promotion instances are also included in the results.

Table 2: CATCH Go, Slow, Whoa Foods Criteria

Go

- "Whole foods," or those that are minimally processed, and low in salt, sugar, and unhealthy fats

Examples

- Fresh or frozen fruit
- Fresh, frozen, or canned vegetables
- Whole-grain bread, pasta, rice, crackers; corn tortillas, baked tortilla chips
- Unsweetened 1% milk, low-fat cheese, unsweetened or 100% fruit-juice sweetened yogurt

Slow

- These foods are moderate, relative to "go" and "whoa" foods

Examples

- Fruit canned in light syrup, dried fruit with added sugar
- Baked French fries or fresh/frozen/canned vegetables prepared with vegetable oil
- From refined, white flour: bread, pasta, rice, low-sugar cereal, and low-fat crackers
- Baked potato chips, pretzels, cereal/fruit bars
- 2% milk, flavored fat-free milk, low-fat yogurt (sweetened), low-fat ice cream or frozen yogurt

Whoa

- Generally the most processed and highest in unhealthy fats, added sugar, and/or salt

Examples

- Fresh/frozen/canned vegetables prepared with solid fats, battered, and/or fried
- Fruit canned in heavy syrup or fruit roll-ups
- Muffins, donuts, pancakes, waffles, and French toast made with solid fats
- Potato chips, cheese puffs, high-fat crackers, high-sugar cereal
- Whole milk, flavored 2% milk, whole-milk yogurt, processed cheese, ice cream, whole-milk cheese

Pilot Study Results: Preliminary Data

Many of the signs and items were consistent between all of the pilot schools. For instance, all schools had at least one "multi-sign board," a label given by the researchers to a freestanding, moveable board that displayed multiple signs. The contents of the

multi-sign boards varied between schools, but all of the signs were related to nutrition and/or activity. Often the nutrition signs displayed on the multi-sign board contradicted each other, promoting "healthy" foods on some and "unhealthy" foods on others. For instance, one school had a multi-sign board that included a sign promoting green vegetables and one promoting lean protein sources, both of which are healthy choices. On the same multi-sign board, there was a promotion for "epic burgers," which displayed large pictures of hamburgers with various toppings, but no vegetables, and a promotion for Chick-Fil-A, a popular chain restaurant that offers a limited menu in most middle school cafeterias in this district.

Many of the unhealthy items and signage in the pilot schools were found in the cafeteria. Most schools had advertisements, menus, and/or price lists for Otis Spunkmeyer cookies, Blue Bell ice cream, and Tyson chicken. Additionally, most schools had menus, price lists, and advertisements for non-commercial products such as pizza, chicken strips, popcorn chicken, cookies, and burgers sold in the main or a la carte cafeteria lines. Some schools had advertisements for Dasani water and Coca-Cola, usually on the side of a drink cooler or vending machine.

Products displayed served as a form of food and beverage promotion in the school environment. For instance, every pilot school had foods and drinks for sale and openly displayed in the a la carte and/or main lines. Products included snack foods such as chips (i.e., Doritos, Chex Mix, cereal bars, pretzels, Rice Krispie Treats) and drinks (i.e., Gatorade, V8 Splash, Milk, Sweet Leaf Tea, water, 100% juice). Every school had large,

fountain-type drink machines that contained colored liquids, typically fruit punch or "slushy" beverages.

Very few signs were found in the school gyms, and the signs that were posted in gyms predominantly promoted healthy foods and beverages and physical activity. CATCH signage was found posted throughout the building in most of the pilot schools. Information on these signs included the general promotion of staying healthy by eating nutritious foods, being physically active, and drinking more water. Most schools displayed at least one CATCH banner, which promotes physical activity and healthy eating through pictures.

Preliminary prevalence data of signs and items documented in the pilot schools as healthy or unhealthy, based on CATCH Go, Slow, Whoa criteria are shown in Table 3.

Table 3: Categorizations of Food and Beverage Promotion in Five Middle Schools in Central Texas

	Items				Signs			
	"GO" Items		"Slow & Whoa" Items		"Go" Signs		"Slow & Whoa" Signs	
	Quantity	Percent of Total Items	Quantity	Percent of Total Items	Quantity	Percent of Total Signs	Quantity	Percent of Total Signs
School								
	1	2.6%	38	97.4%	7	30.4%	16	69.6%
	1	2.3%	42	97.6%	25	52.1%	23	47.9%
	0	0.0%	8	100.0%	11	36.7%	19	63.3%
	3	6.4%	44	93.6%	30	75.0%	10	25.0%
	7	21.9%	25	78.1%	14	60.9%	9	39.1%

Pilot Study Results: Logistics and Feasibility

After the completion of pilot data collection, it became apparent that while the data collection is feasible for one person to do, it is more efficient and streamlined for two data collectors to work together. Because one of the goals of a larger-scale project was to collect data with as little interruption in the schools as possible, limiting the amount of time data collectors spend in the school was of primary importance. Inter-rater reliability was of concern, however it was deemed unnecessary to conduct these reliabilities at every data collection and determined that they would be assessed in approximately 10% of all schools in a larger study. Some of the feasibility issues (e.g., taking time to write descriptions for each sign or product) were reduced or eliminated in the future full-scale study, since an electronic tool was used for data collection.

In-school data collections presented specific challenges. For instance, during the pilot study, taking quality pictures of types of food/beverage and activity promotion quickly, and without including students, proved to be difficult in some cases. Working around school schedules and interacting with staff were also challenging in some instances. Additionally, minimizing time spent in schools without sacrificing quality of the data collected was also a challenge. In some schools timing was an issue, since the cafeteria staff stocks the main and a la carte lines before the first lunch period. Specifically, if data collectors arrived before the first lunch period, there were more items to document; for later data collections or those that took place during a lunch period (when students had already purchased many of the items), the amount of items

documented may not be representative of what some children are exposed to. In most schools, staff replenished items between lunch periods. These circumstances indicated that representative data may be best collected just prior to a lunch period beginning, when the middle school schedule permits. However, it should be noted that this requires quick data collection, as there is a small window of time when the cafeteria is stocked and open for data collectors before students are present. This reinforced the need for a new, faster data collection tool, which was developed for the larger-scale study observations.

Pilot Study Results: Tool Development

From the pilot study, researchers were able to better determine which aspects of the pencil/paper observation measure were most useful and which needed to be modified or deleted. One of the major issues identified in pilot data collection was whether or not to include passive instances of nutrition- and activity-related promotion. At times, it was difficult to determine what was most important and potentially impactful. For instance, trophies and sports pennants are very prevalent in middle schools. However, it was unclear if the shear presence of these items were powerful physical activity promoters, thus we decided to document only direct physical activity messages in the current study (physical activity signage was not the focus of the current dissertation). We felt that the same criteria should be used for passive versus direct nutrition messaging. However, in most of the schools, we encountered large signs hanging in the main cafeteria lines that displayed pictures of food such as fruit and hamburgers. Some of these signs had descriptive words (i.e., fresh, focus), but the words did not directly promote nutrition or

activity. We decided that these signs with passive messages were noteworthy since the signs were very visible, displayed large photos, and were located in an area where students make decisions about what to choose for lunch.

Data collectors wrote a lot of information freehand because the collection tool lacked appropriate ways to document the a la carte items and signs that were found primarily in the cafeteria. A descriptive, useful, and discreet way to estimate the size and space available for a la carte and vending machine items was needed in the final tool. Also, preset categories and options, based on the pilot data, were included in the final electronic tool, the In-School MEDIA Direct Observation Tool (In-School MEDIA DOT).

3.4 Larger-Scale Study

Larger-Scale Study Design and Schools

For the larger-scale study, we examined food, beverage, and physical activity promotion in the middle school environment by conducting direct observations of related advertising, promotion, and signage in schools. Data collection took place in the spring of 2012 in 30 central Texas middle schools (grades 6-8). According to Texas Education Agency (TEA) data from the 2011/2012 school year, mean enrollment for the 30 schools was 923 students per school (Standard Deviation [SD] = 225). The mean percentage of school composition of economic disadvantage (as measured by the number of students who qualify for free/reduced lunch) was about 61%, with a range of 12% to 97%. A

majority of the students were Hispanic (53.6%), followed by White (27.2%), African American (14.3%), and Other (5.2%). Schools where data were collected were part of the CATCH project, and district approval for this study was obtained through CATCH.

Larger-Scale Study Measures

After use in the pilot study, the pencil/paper tool (described above in the *CATCH* and *Pilot Study Measures* sections) was adapted for use in the dissertation direct observations study. The In-School MEDIA DOT, an electronic data collection tool, was developed for the current study in FileMaker, database software that allows for data collection and entry to occur simultaneously. Data can be managed through this software and accessed on multiple devices, including an iPod Touch, through the use of the FileMaker Go Application. We had one electronic FileMaker file for each school, and each instance of food/beverage or activity promotion was indicated on its own record within the file. Within each record, the data collection tool had the capabilities for taking photos, using drop-down menus to further describe the promotion instance (these menus were designed from pilot data), and an area for notes.

Larger-Scale Study Methods

Direct Observation Methods

Direct observations of food, beverage, and physical activity promotion in high-traffic areas of the school (i.e., cafeteria, gym, and major hallways) were assessed. Prior to in-school observations, all data collectors were trained on the data collection procedure, including examples of types of promotion that may be encountered, criteria

for coding each occurrence, and how to photograph and document each occurrence in the FileMaker Go program with the iPod Touch. Data collectors were briefed on general school visitor rules, and dress and conduct codes.

Two data collectors, myself and another student, conducted the in-school observations. Data collectors checked in and out with the main office at each school and obtained a map of the school's interior. We reviewed the school map and determined, generally, an efficient way to move through the school. The two data collectors moved through the main hallways, gym, and cafeteria, documenting each occurrence of food, beverage, and/or physical activity promotion. Primarily, I identified each incidence of food, beverage, and/or activity promotion and the second data collector (assistant) served as the data recorder. However, the assistant also pointed out any instance that she saw, which helped ensure we had documented all visible instances. The assistant documented the descriptions and took pictures, using FileMaker on the iPod Touch. The two data collectors discussed any categorization and/or description of marketing/promotion occurrences that did not clearly fit the options developed in the FileMaker program (those described above in the CATCH and *Pilot Study Results: Tool Development* sections), in order to determine the most appropriate categorization. As we expected from pilot data collections, each in-school observation took approximately one hour. When possible, we conducted observations before lunch (approximately 10-11:30 a.m.), as this is when most of the a la carte and main lunch options have been displayed and before students have

begun to enter the cafeteria for lunch. No pictures were taken of students or when students were near the food/beverage/activity promotion occurrence.

Chapter 4

Reliability Studies

An efficient tool to directly measure food and beverage promotion in a middle school environment did not exist, thus an existing pencil/paper tool was adapted to develop an electronic tool, the In-School MEDIA DOT, for use in the In School MEDIA study (described in Section 3.0). Based on the large-scale study to assess the in-school food and beverage environment (described in Section 3.0), this innovative tool appears to be useful. However, intra- and inter-rater reliability had not been established. As part of the current dissertation project, reliability analyses were conducted on the electronic observation tool. The current section discusses research questions, methods, and analyses for the inter- and intra-rater reliability assessments that were conducted to determine the electronic tool's utility for future studies.

4.1 Research Questions

1) Is a new electronic tool a reliable instrument to measure food/beverage and physical activity promotions in middle schools, using one rater across two time points (intra-rater reliability)?
2) Is a new electronic tool a reliable instrument to measure food/beverage and physical activity promotions in middle schools, using two raters (inter-rater reliability)?

4.2 Methods & Analyses

Intra-rater Reliability

For this part of the project, data were compared for one rater between two data collection time points, in order to gain an idea of the overall agreement between documented instances and between fields within the electronic tool. One data collector and an assistant went to three middle schools, at two different time points (2 days apart), to assess food/beverage and physical activity promotion in middle school environments. Two days between data collections was chosen in an attempt to avoid drastic changes within the school environment between data collections (which would have compromised the tool's reliability). The information presented in Section 3.0 describes in greater detail the general protocol that was used in all data collections for the current project.

The overall percentage of documented instances of promotion that were in agreement for one rater, between the two time points, was assessed for all matching records and for each field within the matched records. First, for each school, records that documented each instance of food and/or beverage promotion were manually matched between the two time points by finding similar images and field notes, matching categories (e.g., CATCH promotion, Advertisement Type, Quantity), and matching number of instances. The first time point for each school served as the standard, and records from the second time point were matched with as many records from the first data collection as possible. Percentages that indicated the overall agreement between instances documented at each time point were generated (which will be referred to as agreement at "Level 1").

Next, using a function in FileMaker, the percentage agreement between each field within these matched records was generated (will be referred to as agreement at "Level 2"). This required assigning a unique number to each record within the file, which would ensure there was always one field that matched between the two sets of records (i.e., this unique number was the same for each record, across the two files). Code was written that instructed FileMaker to generate a percent agreement between the two files, for each record. Each advertisement record had 12 possible data entry fields, and each item record had 6 possible entry fields (excluding the six photo and two freehand fields, as these were not pertinent to the reliability study). The FileMaker analysis was chosen, instead of a Kappa analysis, because it was the most accurate and efficient way to assess agreement within the measurement tool as designed. The FileMaker function allowed each record to be assessed as a whole. The Kappa analyses would have required the deconstruction of each record, for each school, thus the Kappa approach would not have accurately reflected the reliability of all fields within each record. Additionally, although Kappas account for the level of chance agreement, the level of chance agreement varied between each record and within each school. Therefore it was determined that Kappa analyses were not appropriate for this study.

However, the percentages of agreement were interpreted according to Kappa statistic standards, because of similarities between Kappa statistics and the analyses used in FileMaker and due to established standards for Kappa statistics (Landis & Koch, 1977). A Kappa value of 1 indicates complete actual agreement, whereas a kappa of 0

indicates complete chance agreement (Table 4). For the current study analyses, a level of 100% indicated complete agreement between all fields in the FileMaker tool, within the matched record between the two time points. These percentages were then averaged to indicate the average percent agreement for each school. Percentages for the individual schools were averaged to provide an overall average percent agreement for the three schools.

Table 4: Interpretation of Kappa Statistics

Kappa	Agreement
< 0	Less than chance agreement
0.01–0.20	Slight agreement
0.21– 0.40	Fair agreement
0.41–0.60	Moderate agreement
0.61–0.80	Substantial agreement
0.81–0.99	Almost perfect agreement

A percent agreement of ≥ 70% for each of the electronic tool fields, between time points, was considered acceptable, given that a kappa statistic of ≥ 0.70 for observer agreement is considered acceptable (Landis & Koch, 1977). Details describing reasons for discrepancies were included for records that had <50% agreement between the two time points. Additionally, analyses were rerun with these records excluded, to provide an idea of reliability without outliers. Analyses were managed in FileMaker (FileMaker, Inc, 2010).

Inter-rater Reliability

Four data collection team members went to each of the six randomly selected schools (20% of the total sample), and data collection times ranged from approximately 20-75 minutes per school (Section 3.0 describes additional details regarding the sample and data collection). First, all team members checked in with the main office and obtained a map of the school's interior. All investigators, working in teams of two, methodically moved through the school and identified food, beverage, and physical activity promotion in the main hallways, gym, and cafeteria at each school. Each team started on opposite sides of the school in order to avoid hearing and seeing the other team as each promotion was documented. As each promotion was identified, the researchers would discuss categorization, description, and other pertinent details. The senior researcher for each team was the primary identifier of each instance of promotion and gave instructions regarding any additional notes that needed to be recorded. A research assistant took a picture and documented details (e.g., location, description, quantity), and also helped to identify any promotion instances the senior researcher may have missed.

Data were compared between the two data collection teams, in order to gain an idea of the overall agreement between documented instances and between fields within the electronic tool.

First, each instance of food/beverage or physical activity promotion was matched between the two raters' (or teams) records. For each school, between the two teams, records that documented each instance of food and/or beverage promotion were manually

matched by finding similar images and field notes, matching categories (e.g., CATCH promotion, Advertisement Type, Quantity), and matching number of instances. The first team served as the standard, and records from the second team were matched with as many records as possible from the first teams' records. Percentages that indicated the overall agreement between instances, documented between each team, were generated (again, this will be referred to as agreement at "Level 1").

Second, agreement between each relevant field within each matched record, between the two raters, was assessed (which will be, again, referred to as agreement at "Level 2"). Using a function in FileMaker, the percentage agreement between each field within these matched records was generated. Similar to the intra-rater reliability analyses, this required assigning a unique number to each record within the file, to ensure one field matched between the two sets of records (i.e., this unique number was the same for each record, across the two files). Code was written that instructed FileMaker to generate a percent agreement between the two files, for each record. Each advertisement record had 12 possible data entry fields, and each item record had 6 possible entry fields (excluding the six photo and two freehand fields, as these were not pertinent to the reliability study).

Similar to the intra-rater reliability assessment, the FileMaker analysis was chosen, because it was the most accurate and efficient way to assess agreement. The FileMaker function allowed each record to be assessed as a whole, whereas Kappa analyses would have required the deconstruction of each record (which would not have accurately reflected the reliability of all fields related to each record). Again, although the

Kappa analysis accounts for agreement due to chance, the level of chance agreement varied between each FileMaker record, within each school. Thus, it was determined that Kappa analyses were not appropriate for the current study.

Again, the percentages of agreement were compared to Kappa statistic standards, because of similarities between Kappa statistics and the analyses used in FileMaker, and due to the established standards for Kappa statistics (Table 4). A level of 100% indicated complete agreement between all fields in the FileMaker tool, within the matched record between the two teams. The percentages were averaged to indicate the average percent agreement for each school. Percentages for the individual schools were averaged to provide an overall average percent agreement for the six schools. As with the intra-rater reliability check, a percent agreement of ≥ 70% for each of the electronic tool fields, between two raters, was considered acceptable for the inter-rater check, given that a kappa statistic of ≥ 0.70 for observer agreement is considered acceptable (Landis & Koch, 1977). Details describing reasons for discrepancies were included for records that had <50% agreement between the two time points. Additionally, analyses were rerun with these records excluded, to provide an idea of reliability without outliers. Analyses were managed in FileMaker (FileMaker, Inc, 2010).

4.3 Results: Reliability Analyses

Intra-rater Reliability

Schools included three middle schools from 2 school districts, and had an average of 855 students (grades 6-8) (Table 5).

Table 5: Sample Descriptives for Intra-rater Reliability Study

	Students Enrolled (#)	Race/Ethnicity (%)		Gender (% male)	Free/Reduced Lunch (%)
School A	663	Amer Ind/Alaskan Asian/Pacific Islander Black Hispanic White	0.5 3.3 12.3 45.3 38.6	52	54
School B	953	Amer Ind/Alaskan Asian/Pacific Islander Black Hispanic White	0.1 0.7 8.1 86 5	53	90
School C	949	Amer Ind/Alaskan Asian/Pacific Islander Black Hispanic White	0.9 5.6 6 31.9 55.8	50	28
Average	855	Amer Ind/Alaskan Asian/Pacific Islander Black Hispanic White	0.5 3.2 8.8 54.4 33.1	52	57

Level 1

Results indicating the average percent agreement between records (i.e., agreement in documented food and beverage promotion instances) within the same rater, across two

time points, are shown in Table 6. Across three schools, or 10% of the sample, the intra-rater reliability ranged from 94.9-96% (using Time 1 data collection as the default). The average intra-rater reliability across all three schools was 95%.

Table 6: Data Collection Tool Intra-rater Reliability – Average Agreement Between Each Record

	Time 1 as Default	
	# Matched Records/Total	Average Percent Agreement
School		
School A	37/39	94.9
School B	24/25	96.0
School C	37/39	94.9
Range		94.9-96
Total - All Schools		95.3

Level 2

Results indicating the average percent agreement between individual fields within each matched record (i.e., each coded field within each record), across two time points for one rater are shown in Table 7. The average percent in agreement between fields for each matched record for School A ranged from 50-100% for ads and 83-100% for items, with an overall average of approximately 92%. A low percent agreement (50%) between fields within one ad record can be accounted for because the ad was labeled as a CATCH bulletin board at time 1, but the same ad was not labeled as such at time 2. This affected agreement between other fields. Specifically, the time 1 record where the ad was not labeled as CATCH also had different information in the "CATCH Brand" and "CATCH Ad Type" fields, as compared to time 2. There was a discrepancy between "Quantity"

fields, as well, because one "Quantity" field accounted for the CATCH bulletin board, while the other "Quantity" field accounted for multiple ads on the bulletin board. Another ad record showed low percent agreement (66.7%), because a field was left blank and the quantity fields did not match.

The average percent agreement between fields for each matched record for School B ranged from 42-100% for ads and 83-100% for items, with an overall average of approximately 95%. The low level of agreement in one ad record (42%) was due to several fields that were left blank at time 2. Table 7 reflects average percent agreement with this record included. However, when this record was excluded from analyses, the overall average percent agreement for ads for School B increased from 93.5% to 96.4% and the total for School B increased from 94.8% to 96.2%. This affected the total average percent agreement across all schools in the following way: total percent agreement for ads increased from 89.3% to 90.3% and the total percent agreement increased from 91% to 91.5%.

The average percent agreement between fields for each matched record for School C ranged from 50-100% for ads and 67-100% for items, with an overall average agreement of approximately 87%. The low percent agreement (50-67%) for five ad records was due to blank fields (including "MultiSign," Commercial," "PA," and "Combo NTR/PA" fields) in the time 2 file, and differences in entries for the "Quantity," "Professional," and "Ad Description" fields. An incorrect entry for the "Display" field at time 2 accounted for a low-level item record agreement (67%).

Table 7: Data Collection Tool Intra-rater Reliability - Average Percent Agreement Between Individual Fields (within each record)*

School			
	Ads	Items	Total
School A	90.2	93.3	91.8
School B	93.5	96.0	94.8
School C	84.2	89.0	86.6
Range	84.2-93.5	89.0-96.0	86.6-94.8
Total - All Schools	89.3	92.8	91.0

*Outliers included

Inter-rater Reliability

Schools included six middle schools from three school districts, and had an average of 826 students (grades 6-8) (Table 8).

Table 8: Sample Descriptives for Inter-rater Reliability Study					
	Students Enrolled (#)	Race/Ethnicity (%)		Gender (% male)	Free/Reduced Lunch (%)
School D	1,051	Amer Ind/Alaskan Asian/Pacific Islander Black Hispanic White	0.5 8.0 10.8 32.2 48.5	50	33
School E	1,010	Amer Ind/Alaskan Asian/Pacific Islander Black Hispanic White	0.2 2.1 8.7 73.4 15.6	52	76
School F	781	Amer Ind/Alaskan Asian/Pacific Islander Black Hispanic White	0.0 6.4 28.4 54.9 16	55	76
School G	677	Amer Ind/Alaskan Asian/Pacific Islander Black Hispanic White	0.0 1.4 10.5 87.3 0.7	53	95
School H	865	Amer Ind/Alaskan Asian/Pacific Islander Black Hispanic White	0.1 0.0 9.7 89.5 1.0	53	94
School I	572	Amer Ind/Alaskan Asian/Pacific Islander Black Hispanic White	0.2 0.3 11.4 85.8 2.3	54	97
Average	826	Amer Ind/Alaskan Asian/Pacific Islander Black Hispanic White	0.2 3.0 13.3 70.5 14.0	53	79

Level 1

Results indicating the average percent agreement between records (i.e., agreement in documented food and beverage promotion instances) between two raters, at the same point in time, are shown in Table 9. Across six schools, or 20% of the sample, the average percent agreement of matched records between the two data collection teams ranged from 73.1-96.3% (Team 1 as the default). Average percent of matched records across all three schools was 88.0%. There were no outliers to report, as instances of disagreement resulted when one team did not document something or when there was no clear match between the two teams.

Table 9: Data Collection Tool Inter-rater Reliability – Average Agreement Between Each Record

	Team 1 as Default	
	# Matched Records/Total	Average Percent Agreement
School		
School D	37/41	90.2
School E	24/26	92.3
School F	26/27	96.3
School G	25/26	96.2
School H	19/26	73.1
School I	20/25	80.0
Range		73.1-96.3
Total - All Schools		88.0

Level 2

Results indicating the average percent agreement between individual fields within each matched record, between two raters, are shown in Table 10. The average percent agreement between fields for each matched record for School D ranged from 17-100% for ads and 50-100% for items, with an overall average of about 79%. Low levels of agreement between ad records (17-67%) between the two teams were due to incorrect or insufficient identification of student-made ads. For instance, there was a student-made project with 3 Dasani water bottles that team 1 counted as 3 instances of promotion (to account for the labels), whereas, team 2 counted this as 1 student-made ad. When the record with 17% agreement was excluded from analyses, the overall average percent agreement for ads for School D increased from 79.2% to 81.3% and the total for School D increased from 79.2% to 80.3%. This affected the total average percent agreement across all schools in the following way: total percent agreement for ads increased from 83.2% to 83.5% and the total percent agreement increased from 82.3% to 82.5%.

There were discrepancies among other fields, (i.e., "Ad Communication," "Quantity") between the teams, for some records with low agreement (67%). One ad record had low agreement (42%) due to the CATCH Bulletin Board description. Specifically, one team did not document the ad as a CATCH Bulletin Board instance, which affected other fields (similar to the previously mentioned issues in the intra-rater reliability check). When the record with 42% agreement was excluded from analyses, the overall average percent agreement for ads for School D increased to 80.5% and the total

for School D increased to 79.8%. This affected the total average percent agreement across all schools in the following way: total percent agreement for ads increased from 83.2% to 83.4%, and the total percent agreement increased from 82.3% to 82.5%.

The low percentage of agreement (50%) between the two teams on an item record was due to the inability of the tool to account for multiple products within the same display case. Thus, the two teams differed on the item that was chosen in the "Item Description" field.

When the two records with the lowest percent agreement (17% and 42%) were simultaneously removed, the overall percent agreement for School D ads increased from 79.2% to 82.7%, and the total for School D increased from 79.2% to 82.1%. This affected the total average percent agreement across all schools in the following way: total percent agreement for ads increased from 83.2% to 83.8%, and the total percent agreement increased from 82.3% to 82.8%.

The average percent agreement between fields for each matched record for School E ranged from 67-100% for ads and 83-100% for items, with an average percent agreement of approximately 76%. The low agreement (67%) between ad records for the two teams was due to discrepancies in the "Ad Communication," "Commercial," "Ad Description," and "Ad Category" fields. Additionally, there were discrepancies (67% agreement) due to the CATCH Bulletin Board description and because some fields were left blank by a team in some records. Other areas where there were discrepancies (67%

agreement) were the “PA” and “Combo NTR/PA” fields, in that if the “PA” field was entered incorrectly, it often affected the “Combo NTR/PA” field.

The average percent agreement between fields for each matched record for School F ranged from 58-100% for ads and 67-100% for items, with an average agreement of about 85%. Low agreement between one ad record (58%) was due to differences in the “Ad Category,” “Ad Communication,” and “Ad Description” fields. Additionally, there was a discrepancy between the two teams on the “PA” and “Combo NTR/PA” fields (as was previously mentioned). The low agreement (67%) between the item record was due to discrepancies in the “Logo” and “Item Description” fields.

The average percent agreement between fields for each matched record for School G ranged from 67-100% for ads, with all records in 83% agreement for items, and with an average of approximately 84%. The low level of agreement (67%) for one ad record was due to differences in the “Ad Category,” “PA,” and “Combo NTR/PA” fields. Additionally, one team left a field blank.

The average percent agreement between fields for each matched record for School H ranged from 0-100% for ads and 67-83% for items, with an average agreement of about 74%. The low level of agreement (0%) for one ad record was because team 2 did not fill out any fields for the record, but had a picture and brief description. When the record with 0% agreement was excluded from analyses, the overall average percent agreement for ads for School H increased from 75.6% to 82% and the total for School H increased from 73.9% to 77%. This affected the total average percent agreement across

all schools in the following way: total percent agreement for ads increased from 83.2% to 84.3% and the total percent agreement increased from 82.3% to 82.8%.

The low level of agreement (58%) on one ad record was due to differences between the “Ad Category,” “Quantity,” “PA,” and “Combo NTR/PA” fields regarding a student-made ad. Another low agreement record (58%) was due to discrepancies between “Ad Category,” “Ad Description,” “PA,” and “Combo NTR/PA” fields. Another low agreement record (67%) was due to differences in the “Ad Communication,” “Quantity,” and “Commercial” fields, and the :Ad Description” field was blank for one team’s record. The low level of agreement (67%) between two item records was due to a discrepancy among the “Item Description,” “Quantity,” and “Display” fields.

The average percent agreement between fields for each matched record for School I ranged from 75-100% for ads, with all records in 100% agreement for items, and with an average percent agreement of about 95%.

When the three records with low agreement, across all six schools, were excluded from analyses, the average percent agreement for ads across all schools increased from 83.2% to 84.8%. Average percent agreement for items was unaffected, and the total average agreement across all schools increased from 82.3% to 83.3%.

Table 10: Data Collection Tool Inter-rater Reliability – Average Percent Agreement Between Individual Fields (within each record)*

School			
	Ads	Items	Total
School D	79.2	79.2	79.2
School E	81.0	71.0	76.0
School F	87.8	83.0	85.4
School G	85.0	83.0	84.0
School H	75.6	72.2	73.9
School I	90.5	100.0	95.2
Range	79.0-90.5	71.0-100.0	76.0-95.2
Total - All Schools	83.2	81.4	82.3

*Outliers included

4.4 Discussion: Reliability Analyses

Intra-rater Reliability

Level 1

Overall the new data collection tool showed excellent intra-rater reliability, indicating that food and beverage promotions were consistently documented at each time point by the same rater. The consistent intra-rater reliability established in the current project is valuable, given the current lack of a reliable tool designed to collect objective data from the middle school environment.

The majority of food/beverage promotion instances were documented at both time points, however there were some instances that were either labeled as something different, were combined with other (similar) promotions, or were miscounted. Some

discrepancies were between records that documented Nutrition Education and Hanging Passive Food Sign promotions. These categories may not have been well defined, which may have led to some inconsistencies. In some cases, it was not possible to determine if records between time points matched, because there were no pictures and/or sufficient descriptions.

Additionally, instances of promotion may not have been consistently documented if they were located in areas that were less visible (e.g., signs that were hung high or low, or signs that were partially blocked). These are things that should be addressed for future data collection in order to further clarify when to document promotions. Some inconsistencies in the reliability analyses may be accounted for by a change in the environment between data collections. For example, cafeterias may have been running low on a la cart items or signage in the school may have been removed or added. However, in an attempt to address this possible change in environment, no more than 2 days passed between data collection time points.

Overall, the tool is a useful way to document the food/beverage environment in middle schools, across time points. Specifically, the tool showed good reliability at Level 1, which represents the overall agreement between promotional instances documented at each time point.

Level 2

Overall, there was sufficient intra-rater reliability between fields, within each record. The reliability at this level indicates that the fields within the tool used to describe

instances of food and beverage promotions are useful and can be accurately completed by one rater across two time points.

Some fields that were less reliable were related to documenting CATCH promotions. For instance, the CATCH Bulletin Board (an option listed under the CATCH brand field, along with options of Yes, No, and Unknown) was a problematic field because it typically consisted of several instances of promotion within the larger bulletin board. It was unclear if this should be documented separately (and, if so, what else to include in the record for it), or if each individual item on the bulletin board should be coded (thus negating the need for a CATCH bulletin board categorization). In the future, these categorizations should either be more clearly defined or eliminated from the tool. If the tool is used in a CATCH (or similar) program, the definition of the bulletin board category and when/how it should be documented should be more clearly defined.

Other fields in the data collection tool that had the most discrepancies included the MultiSign, PA, and Combo NTR/PA fields. Originally, it was thought that the MultiSign field would be useful, because freestanding boards with multiple signs were identified during pilot data collection. The Multisign description posed a similar problem to the bulletin boards as described above, in that it was difficult to determine when something should be coded as one large instance, and when it should be deconstructed and coded for each of its parts. After collecting data in several schools, it was determined that the MultiSign categorization was not of use, and the signs contained within these boards were eventually documented and coded separately. The PA and Combo NTR/PA

fields were originally included as a way to account for some of the physical activity promotion instances in schools. However, it was sometimes unclear what counted as an instance of physical activity (we were only documenting direct instances), or whether to label something as Combo NTR/PA if it was a passive instance of PA. Additionally, after examining the level of agreement between fields, it was clear that these two fields were linked, thus when something was documented incorrectly for one, it was often documented incorrectly for the other.

Some of the discrepancies in reliability were due to inconsistencies between the Quantity fields, which were often effected by the discrepancies between the other fields. For instance, if a rater indicated something was a CATCH bulletin board, rather than documenting the individual nutrition education posters on the board as separate records, the quantity would have been incorrectly labeled as 1. Additionally, sometimes fields were left blank, potentially because the rater did not think that particular field was pertinent to the promotion instance, or because the field was inadvertently overlooked. It is recommended that, in the future, an option (for each field in the instrument) be included that allows data collectors to indicate when something was inapplicable so that it may be distinguished from instances where the category was simply overlooked. This could include options such as "not applicable," or "not identifiable." Some fields in the original tool had "unknown" and "other" options. However, these options lacked descriptions to indicate when it was appropriate to use them and were not well defined prior to data collection.

The Professional field in the data collection tool was another area that showed some discrepancies between time points. This category may not have been clearly defined, may not have been identifiable in all instances, or may have been overlooked. It is possible that this category may need further explanation in order to be useful, or that it may be unnecessary to include in future projects.

The Ad Description field was another area where there appeared to be issues. Upon further examination, it appears that the options for this field may have been too specific, yet not all-inclusive. In other words, some specific products were listed as possible categories (e.g., Coca-Cola, Otis Spunkmeyer), yet not *all* possible products were included. This may have made it difficult for data collectors to determine how to classify certain promotion instances if the specific product was not available to choose. It may have been helpful to include more general categories (as was done in the coding template) to allow for more accuracy across time points. The level of specificity that is needed can be identified during the coding process if there are pictures or sufficient descriptions for each instance documented in the field.

Another potential reason for the few issues with the tool's intra-rater reliability may be due to human error. Some aspects of human error (e.g., missing instances to document) may be difficult to address. However, it is likely these types of error were minimal given that there were two people indentifying promotion instances, data collectors walked slowly to thoroughly examine the environment, and because of the limited areas that were assessed (i.e., halls, cafeteria, gyms). Another aspect of human

error may be the incorrect labeling of a picture or description in one or more of the other fields. However, data were checked and questions that arose were discussed. In the future, having multiple checks of the data after leaving the field should help minimize incorrect documentation. Additionally, including detailed descriptions of instances that are unable to be photographed will help to maximize accuracy.

Despite some discrepancies between tool fields at Level 2, the overall tool appears to be a reliable way to document food/beverage promotions in the middle school environment. The high level of reliability at Level 1 is advantageous, in that food/beverage and activity promotion instances were consistently documented. Thus it is possible to adjust individual field information as needed upon data entry/coding.

Inter-rater Reliability

Level 1

Results show that food and beverage and activity promotions were consistently documented between each data collection team. Overall the new data collection tool had excellent inter-rater reliability, which is a positive finding that shows that the too may be used with multiple data collectors in the future.

There were a few reliability issues that should be noted. Some inconsistencies may be accounted for by differences in the way promotion instances were documented with the data fields in the FileMaker tool. However, regardless of the level of agreement between each field in the tool used to describe each instance, there was consistent

documentation of the existence of promotion instances, either through descriptions and/or pictures. This is encouraging, as it indicates that the criteria for what to document was followed consistently. Discrepancies for how things were categorized are something that may be remedied outside of the field, upon data entry/checking.

The fact that there were few cases where one team did not document something that should have been documented is a positive finding. More often, there were discrepancies between the categorizing of some promotions and the inability to accurately describe some instances with the available fields and options in the tool. For instance, when there was a bulletin board or multisign board that contained several posters, it seemed to be difficult for data collectors to accurately document all signs present on the board. One team handled this by adding additional records to account for all of the items on the board. The other team chose the descriptor that described one instance on the board. For example, in one school where this occurred, five records (12%) were affected by the inability to document and describe multiple signs within a larger multisign board. This aspect of the tool and/or data collection protocol should be addressed for future use. Remedies may include adding multiple fields within each record to allow for a description of several promotions within one space. Also, data collectors may be instructed to document each type of promotion in its own record and to take more detailed descriptions of what they see to help with clarifying any discrepancies after data collection.

Most types of promotions were consistently documented, however some discrepancies were seen with student-made promotions. Better descriptions of what to document and how to accurately document quantity in this category are needed for the future. Similarly, instances of passive food and beverage promotions were less consistently documented for some fields (e.g., quantity) within the record and were sometimes labeled as Nutrition Education. Again, reassessment of how and when to document these types of promotions, as well as a clearer definition of what these are, is needed.

There were some discrepancies between the documentation of items, which appeared to be primarily related to noncommercial products. For instance, one team did not document instances of whole fruit and vegetables or cookies that did not have labels, which accounts for some of the discrepancies between the two teams in some cases. Also, it is possible that the placement and visibility of some items changed between the times when the first and second teams collected data (typically between 10 and 30 minutes), which may explain some of the differences in what was documented.

There were a few cases in which one team did not document some less obvious instances of food and beverage promotion. For example, one team documented a poster that was discouraging bullying, because it contained a picture of an orange. In the future, it may be unnecessary to document these types of promotions, given that they are difficult to define and may not be as impactful as direct promotions, such as commercial products.

Despite the few discrepancies that were found at reliability Level 1, inter-rater reliability was established. This is valuable given the current need of a reliable direct observation data collection tool.

Level 2

Sufficient inter-rater reliability at Level 2 was found for the new electronic tool, which indicates that two raters can describe and categorize instances of food/beverage promotion reliably. Some inconsistencies at Level 2 point to areas that need to be better defined prior to entering the field or aspects of the tool that should be adjusted. There were inconsistencies between fields on matched files that documented CATCH bulletin boards. This field option was not properly defined and may need to be included as its own field (e.g., a box that can be checked if it is a CATCH bulletin board) or eliminated from the tool, as it is unclear what information is gained by documenting this. In one case there was a discrepancy because there were non-CATCH nutrition education posters on the CATCH bulletin board. The tool does not have options to document each item on a larger board (see further explanation above in the intra-rater reliability section).

Similarly, there were discrepancies between some documenting of items when there were multiple types of products in one display, because the original data collection tool did not easily allow for distinguishing between multiple types of products within the same display case. This is something that can either be adjusted in the data collection tool (e.g., include an option to type information or choose multiple categories), or can be addressed at the coding stage. Some discrepancies happened when one team incorrectly

labeled a display, which could be because they misunderstood what the different categories were or what was appropriate, or because it was mistakenly entered.

There were a few instances where the Direct/Passive field was not correctly documented by a team, and the definition appeared to be a source of confusion among different data collectors. For future use, it is necessary to better define this categorization, and to discuss various instances and how they should be categorized, prior to data collection. Additionally, it may be helpful to include descriptors and definitions with each term within the FileMaker tool. In other words, instead of saying only "Direct" or "Passive" it may be helpful to include a brief description of what each of these means so that data collectors have a reference.

The Quantity fields presented an area where there were some discrepancies. For example, when there were multiple logos on the same vending/slushie machine, sometimes each ad was not counted, rather the single type of ad was documented and only counted as 1. A more thorough explanation, prior to data collection, of how to count ads, may help decrease discrepancies.

As was the case in the overall matching of records, student-made ads and projects were another type of promotion that led to discrepancies among the fields in each record. For instance, at one school there was a student project that included three Dasani water bottles. This instance should have documented the number of Dasani labels, rather than counting one student-made project, which presents an example of when what was being counted for the Quantity field may have been unclear. Because student-made ads were

often counted or documented differently between teams, this indicates a possible area for change in future tool. Originally, it was unclear how much detail about this type of instance would be needed. It was determined after data collection that little would be gained by documenting details about student-made instances. Therefore the data collection protocol for when/how to document these can be altered, or may not need to be documented at all, for future use.

The Ad Comm, Commercial, Ad Description, & Ad Category fields were different between the two teams, in some cases. For example, one team often labeled commercial logos as passive in the Ad Comm field, which should have been labeled as direct. This is another example of how the definitions for each field should be more clearly stated and somehow available on the tool (i.e., listed with the options on the drop-down menus). However, because it is clear that the same product was documented (due to reliability at Level 1), these issues can be fixed upon data entry outside of the field or upon coding.

Similar to the intra-rater reliability issues, some of the Ad Description field options were insufficient or incomplete, which led to some instances being categorized as the best-fitting option. This is an issue that may be improved by including some of the field options from the coding template in the data collection tool.

There were several records that were not in agreement between the PA and Combo NTR/PA fields across teams. This points to the issue that if the PA field is incorrectly completed, it affects how Combo NTR/PA field is completed, which leaves

more room for error. Thus, there is a need to simplify the tool so that there are not multiple places to document the same thing, which may increase the odds of having multiple fields that do not match, without gaining additional information. For future use, it may not be necessary to document any instances of physical activity. Many of the PA instances that were documented were part of CATCH promotions, therefore it may be redundant to have the PA and Combo NTR/PA as fields in the tool, depending on the purpose of the study and the context of the program.

Teams differed on how they labeled promotion instances as Nutrition Education and Hanging Passive Food sign. It may be most efficient (and more accurate) to include fewer fields on the field data collection tool and allow for specificity to be documented on the coding side of it. Again, there were instances when the Item Description field was left blank, which may have been a function of not having appropriate menu options to describe items. Another adjustment that could be made in the field is the addition of a "not applicable" or "not identifiable" option.

Overall the new electronic data collection tool is a reliable way to document direct observations of the school environment by one rater over time and between multiple raters. The existence of similar data collection tools, to date, has been limited to paper and pencil instruments that are typically completed by schools staff (e.g., nurses, food service workers, principals) (Craypo & Samuels, 2006). Similar aspects of the school environment that were assessed in the current study have been documented with previous instruments, such as food and beverage advertisements on walls, scoreboards,

and vending machines, and descriptions of types of foods and beverages advertised (Craypo & Samuels, 2006). However, the current instrument expands upon existing instruments, in that it captures the food promotion environment more broadly, for example instances of logos on products that are available in schools, and does not rely upon school staff reports. Previous studies have used instruments to assess the food and beverage advertising in high schools (Craypo et al., 2006; CSPI, 2008) and elementary schools (CSPI, 2008), but little has been done to address middle schools. Data were collected in middle schools in Montgomery County, Maryland, however there were only six schools in the study. The current study builds upon this area of school-based food/beverage promotion research by examining middle schools specifically. Middle school students represent a unique population of young consumers who have discretionary funds, the ability to purchase competitive food/beverage products in school, and are exposed to food/beverage advertising in school.

Future studies may use the new electronic tool to assess middle school environments in other geographical areas or to document food and beverage promotions in other environments where youth spend time. Future data may drive policy changes for the types of promotions that are allowed in schools and other youth-oriented locations.

Chapter 5

Direct Observations Study

There is little research on the prevalence and types of food and beverage promotion present in schools. The current dissertation included secondary data analyses of direct observation data that was collected in middle schools using an electronic tool. This section discusses research questions, methods, and analyses for the examination of direct observation data of food and beverage promotion in middle schools using an innovative tool.

5.1 Research Questions

Due to the limited previous research on types and prevalence of in-school food and beverage promotion, hypotheses were not proposed for every research question.

1) What types of food/beverage promotion may be encountered in a middle school environment?
2) What is the overall prevalence of healthy food/beverage promotion in a middle school environment?
3) What is the overall prevalence of unhealthy food/beverage promotion in a middle school environment?
4) What is the proportion of healthy to unhealthy food/beverage promotion in a middle school environment?

It was hypothesized that there would be a higher proportion of unhealthy to healthy food and beverage promotion in the majority of middle schools.

5) How do the types and prevalence of healthy and unhealthy food/beverage promotions vary by school-level variables (i.e., economic disadvantage and percent minority)?
It was hypothesized that economically disadvantaged schools would have a higher prevalence of unhealthy food and beverage promotions, as compared to schools that are not economically disadvantaged.

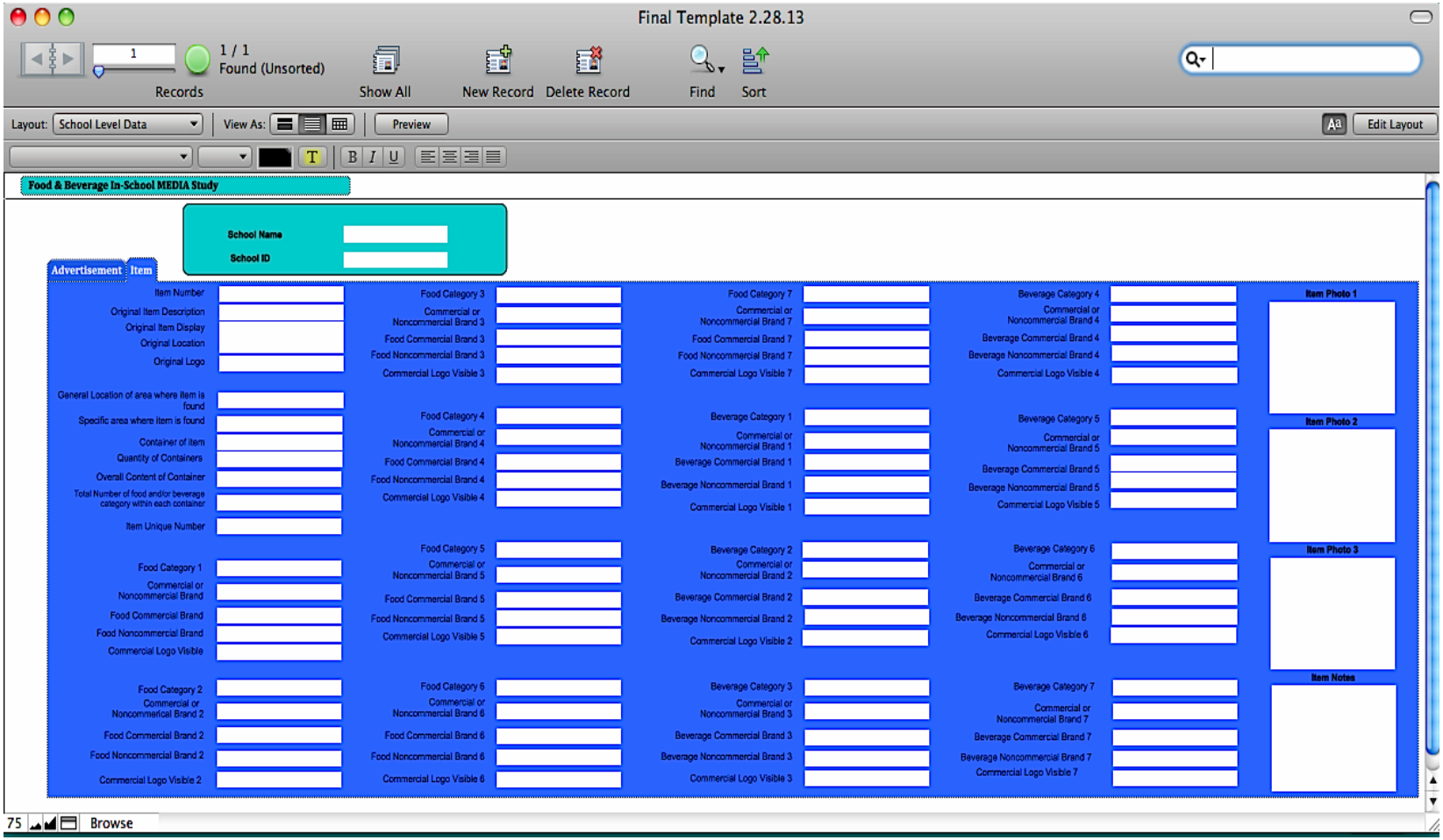
5.2 Methods

Study design, schools, and measures for this study are described in Section 3.0, under the heading "Larger-Scale Dissertation Study."

Coding. Environmental data that were collected in the middle schools (see Section 3.0 for more detail) were coded in order to quantify them in a way that could be used for analyses. To do this, an appropriate coding system was developed. The template file from the original data collection tool was used as a foundation. Building upon this, a coding template was created in FileMaker, which included the original data fields of interest (e.g., CATCH Brand, Advertisement Description, Advertisement Communication, Original Location) and additional fields (e.g., Overall Tone of the Ad, Food/Beverage Type, Commercial Logo Visible) that were important to code for in each picture/description (Fig. 1). An extensive coding protocol was developed that included all aspects of food and beverage promotions that were of interest (Fig. 2) (Appendix B). In addition to the original photo fields (up to three for each record) and notes sections for

ads and items, there were up to 71 fields that could be used to code each ad and up to 75 fields that could be used to code for items. CATCH guidelines were used to define food type categories, which included healthy ("go") and unhealthy ("slow/whoa"). Fields to describe the promotion instances, such as the location, type of display (for food/beverage items), and quantity, were included. Additional fields included whether or not a commercial brand was present, if there was a visible commercial logo, and if advertisements contained passive or direct communication. Developing the protocol was an iterative process, wherein guidelines were tweaked as issues arose from test coding. Protocol drafts were tested for accuracy & user-friendliness by having another person (who was less familiar with the project) use the guidelines to code 40 food and beverage instances. Feedback that was provided was used to help resolve issues, and corrections were made to further refine protocol.

Fig. 1: FileMaker Coding Template



Overall purpose of ad **A la carte line menu** –Menu board, sign, poster etc. that displays multiple a la carte menu items likely with prices. Recall the a la carte definition: Advertisements found in an area where food is sold with a separate price for each item and is not associated with the school lunch meal program. **Breakfast Promo** - Must explicitly promote breakfast (e.g., AmpUp). Any individual items present in the ad should be categorized according to the food category lists. **Nutrition Edu** - Anything that is presented in an attempt to educate about nutrition or help make better decisions in certain contexts, etc. Examples include GoGreen, Bright Color, Big Flavor, Fill up With Fiber, Vit/Min Info, Water, Fast Food/Convenience store options, Caffeine information, Stay Strong Go Lean promo, Energy Balance info, Portion Control advice, Ntr Label/Nutrition: Get the Facts promo, Go/Slow/Whoa signs **Fuel Up and Play 60** – NFL-sponsored campaign that promotes healthy eating and regular physical activity. Specific logo and/or slogan is present on each promotion instance. Only code for this if it is an exclusive Fuel Up and Play 60 promotion. If in conjunction with something else, code for the most prominent theme (i.e., when predominant theme is Got Milk, but the Fuel Up logo is present, code for Got Milk). **Hanging passive food signs** – signs or posters that display passive promotions of food (e.g., apple, hamburger), not to include commercial products (since logos count as direct promotion) or words that directly promote noncommercial items. Only considered passive if there are no other messages on the advertisement. **Individual Item Promo** – Promotion for one item or one item category (e.g., Got Milk? signs, wraps, Epic Burger) **Lunch Menu Calendar** – Calendar format that lists breakfast and/or lunch options available through the National School Lunch Program. **Student-made ad** – may be a sign/poster collage, often with magazine picture cut-outs, or hand-drawn items **Other** – Identifiable, but does not clearly fit in any of the categories above (i.e., general promotion to eat school meals, recycle promotion, something that promotes Nutrition AND PA) **N/I** – Not identifiable. Classification cannot be determined **88. N/A** – Not applicable. Does not apply to this specific advertisement	• Do not code for individual Food or Beverage Category fields (for Nutrition Education, Lunch Menu Calendar, A La Carte Line Menu, CATCH signs) • When multiple signs promoting a la carte items are in one record (may include some signs with one or multiple items listed on a sign), code as A La Carte Line Menu • Code CATCH signs and MyPramid signs that contain Ntr and PA as Other. If MyPyramid sign isn't clear/notes don't specify, code as ntr edu

Fig. 2: Coding Protocol Example

Analyses

Coding Reliability

Reliability of the coding template/protocol between two coders was assessed. Specifically, agreement between each relevant field within each matched record, between the two raters, was assessed (which will be, again, referred to as agreement at "Level 2"). Using a function in FileMaker, the percentage agreement between each field within these matched records was generated. Similar to the inter- and intra-rater reliability analyses, this required assigning a unique number to each record within the file, to ensure one field matched between the two sets of records (i.e., this unique number was the same for each record, across the two files). Code was written that instructed FileMaker to generate a percent agreement between the two files, for each record. Each advertisement record had 71 possible data entry fields, and each item record had 75 possible entry fields (excluding the six photo and two freehand fields, as these were not pertinent to the reliability study).

Similar to the inter- and intra-rater reliability assessment, the FileMaker analysis was chosen, because it was the most accurate and efficient way to assess agreement. The FileMaker function allowed each record to be assessed as a whole, whereas Kappa analyses would have required the deconstruction of each record (which would not have accurately reflected the reliability of all fields related to each record). Again, although the Kappa analysis accounts for agreement due to chance, the level of chance agreement varied between each FileMaker record, within each school. Thus, it was determined that Kappa analyses were not appropriate for the current study.

The percentages of agreement were compared to Kappa statistic standards, because of similarities between Kappa statistics and the analyses used in FileMaker, and due to the established standards for Kappa statistics (Table 4). A level of 100% indicated complete agreement between all fields in the FileMaker tool, within the matched record between the two teams. The percentages were averaged to indicate the average percent agreement for each school. Percentages for the individual schools were averaged to provide an overall average percent agreement for the six schools. As with the inter- and intra-rater reliability checks, a percent agreement of ≥ 70% for each of the electronic tool fields, between two raters, was considered acceptable for the inter-rater check, given that a kappa statistic of ≥ 0.70 for observer agreement is considered acceptable (Landis & Koch, 1977). Details describing reasons for discrepancies were included for records that had <50% agreement between the two time points. Additionally, analyses were rerun with these records excluded, to provide an idea of reliability without outliers. Analyses were managed in FileMaker (FileMaker, Inc, 2010).

Each instance where there was a large discrepancy (<70% agreement) was discussed, and the protocol was updated before the remaining files were coded. One coder coded all the remaining schools; the second coder checked all files for accuracy and consistency and made corrections when necessary. All issues were discussed throughout, so as to maximize consistency.

Direct Observations

Descriptive statistics were run to determine the prevalence and types of food and beverage promotions in schools. Frequencies of the following categories were generated: ad and item types, locations of promotions, commercial food/beverage instances, ad communication, instances of commercial logos, and commercial brand names. Instances of promotions were categorized as healthy or unhealthy based on CATCH Go, Slow, Whoa criteria (Table 2 in Section 3.0). The total number and proportion of healthy and unhealthy promotions were determined. A chi-square goodness-of-fit test was run to determine if the number of healthy promotion instances and the number of unhealthy promotion instances were distributed differently across all schools. Data were examined for potential differences by school-level variables. Specifically, descriptive statistics were run to examine differences in ad and item quantities by economic disadvantage and percent minority. Economic disadvantage was based on the percent of students who qualified for free/reduced lunch. Due to the natural distribution of the current sample and the fact that average state-level economic disadvantage for Texas for 2011/2012 school year was 60% (Texas Education Agency, 2013), the cut point of ≥60% of students who qualified for free/reduced lunch was used to represent more economically disadvantaged schools. Approximately 30% of all students enrolled in Texas public schools in 2011/2012 school year were white (Texas Education Agency, 2013), and the natural distribution of the current sample was at 75% (i.e., 15 schools had ≥75% minority and 15 schools had <75% minority). Thus, the percent minority cut point of 75% was chosen in

the current study, in that schools with ≥75% minority were classified as high percent minority. T-tests were run to examine mean differences in the following categories, by school-level economic disadvantage and percent minority: ad and item quantities, number of unhealthy promotions, number of commercial brands, number of direct ad communications, and number of visible logos. Analyses were managed in PASW Statistics 18 (SPSS, Inc, 2009) and Microsoft Excel (Microsoft Office, 2008).

5.3 Results

Coding Reliability

Schools for the coding reliability analyses included six middle schools from four school districts, and had an average of 912 students (grades 6-8) (Table 11).

Table 11: Sample Descriptives for Coding Reliability Study					
	Students Enrolled (#)	Race/Ethnicity (%)		Gender (% male)	Free/Reduced Lunch (%)
School H	865	Amer Ind/Alaskan Asian/Pacific Islander Black Hispanic White	0.1 0.0 9.7 89.5 1.0	53	94
School J	607	Amer Ind/Alaskan Asian/Pacific Islander Black Hispanic White	0.2 2.3 28.3 61.1 8.1	48	84
School K	693	Amer Ind/Alaskan Asian/Pacific Islander Black Hispanic White	0.3 0.3 38.3 59.9 1.2	54	95
School L	1,440	Amer Ind/Alaskan Asian/Pacific Islander Black Hispanic White	0.3 3.3 19.0 43.8 33.6	50	48
School M	1,005	Amer Ind/Alaskan Asian/Pacific Islander Black Hispanic White	0.0 2.2 9.5 40.4 48.0	55	39
School N	859	Amer Ind/Alaskan Asian/Pacific Islander Black Hispanic White	0.1 9.8 22.4 52.5 15.1	55	69
Average	912	Amer Ind/Alaskan Asian/Pacific Islander Black Hispanic White	0.2 3.0 21.2 57.9 17.8	53	72

Level 2

Results indicating the average percent of agreement between individual fields within each matched record, across six schools (20% of the sample), between two raters at one point in time, are shown in Table 12. The average percent agreement between coding fields for each record for School H ranged from 62-100% for ads and 95-97% for items, with an average agreement of 94%. The low agreement (62%) was primarily because of discrepancies between the "Food Category" field, and other fields associated with it (e.g., "Quantity of Food Category," "Commercial/Noncommercial Brand," "Commercial Logo Visible"). Specifically, one coder coded for every food/beverage on the ad, while the other coder did not. Therefore, there was a lack of agreement on the fields that were complete for one coder, but not the other.

The average percent agreement between coding fields for each record for School J ranged from 90-100% for ads and approximately 87-97% for items, with an overall agreement of approximately 95%. The average percent agreement between coding fields for each record for School K ranged from 47-100% for ads and 89-97% for items, with an average percent agreement of 93%. The low level of agreement (47%, 65%) between two coders on two ad records was due to one coder combining two similar records, while the other coder did not, thus there were discrepancies among "Quantity" fields. Also, there were discrepancies between the "Logo" and "Ad Communication" fields. Additionally the second record had many blank fields for the coder who combined it with another. When the record with 47% agreement was excluded from analyses, the overall average

percent agreement for ads for School K increased from 92.3% to 95% and the total for School K increased from 93.4% to 94.7%. This affected the total average percent agreement across all schools in the following way: total percent agreement for ads increased from 94.3% to 94.7% and the total, overall percent agreement increased from 93.5% to 93.8%.

The average percent agreement between coding fields for each record for School L ranged from 78-100% for ads and 72-97% for items, with an average percent agreement of 92%. The average percent of agreement between coding fields for each record for School M ranged from 65-100% for ads and 84-97% for items, with an average percent agreement of 92%. The low level of agreement (65%) on one ad record was due differences in the "Food Category" fields. The average percent agreement between coding fields for each record for School N ranged from 82-100% for ads and from 75-99% for items, with an average agreement of 93%.

Table 12: Coding Inter-rater Reliability – Average Percent Agreement Between Individual Fields (within each record)

School			
	Ads	Items	Total
School H	91.7	96.4	94.4
School J	96.7	94.1	95.4
School K	92.3	94.4	93.4
School L	95.7	89.0	92.3
School M	93.2	91.3	92.3
School N	96.1	90.7	93.4
Range	91.7-96.7	89.0-96.4	92.3-95.4
Total - All Schools	94.3	92.7	93.5

Direct Observations

Schools included 30 central Texas middle schools from 5 districts. The mean enrollment was 923 students (SD = 225), and the mean percentage of economic disadvantage was 61% (range = 12%-97%). About 54% of students were Hispanic, followed by White (27%), African American (14%) and Other (5%). This information can also be found in the previous Section 3.0.

Types of food/beverage promotions

Frequencies were run to document the types of ads that were found in middle schools (Table 13). The most common type of ad encountered was Nutrition Education (29%), followed by Individual Item Promotions (e.g., Got Milk?, Coca Cola, Epic Burger) (25%), and Hanging Passive Food Signs (i.e., signs that display passive promotions of food that are noncommercial) (14%). Breakfast promotions, Fuel Up and Play 60, and Lunch menu calendars were less common (1.5%, 1.4%, and 1.4%, respectively). Boxtops were least common (0.3%). See Appendix B for further description of each advertisement type.

Table 13: Types of Ads (n=2021)		
	Quantity	Percent of total ads
Nutrition education	586	29.0
Individual item promo	497	24.6
Hanging passive food signs	282	14.0
Other +	264	13.1
A la carte line menu	149	7.4
Student-made ad	119	5.9
Not Identifiable (N/I)	31	1.5
Breakfast promo	30	1.5
Fuel up and play 60	29	1.4
Lunch menu calendar	28	1.4
Boxtops	6	0.3
Total	2021	100.0
+ these are ads that included physical activity or other types of health promotion, where the focus was not necessarily food/beverage. Included things like recycling promotions, general promotion of eating school lunch meals.		

Frequencies were run to determine the types of items that may be encountered in a middle school environment (Table 14). Items were categorized by the display type, therefore quantity refers to the number of instances in which displays were encountered that contained these products. The most prevalent types of items were slushie/fountain punch drinks (28%), followed by whole fruit and/or vegetable (14%), and baked and regular chips (10% each). Less common items were sweet snacks and Minute Maid canned drinks (both 4%), and snack crackers and tea (both 2%).

Table 14: Types of Items (n=453)		
	Quantity[+]	Percent of total[+]
Slushie/fountain punch drinks	126	27.8
Whole Fruit &/or Vegetable	62	13.7
Baked chips	47	10.4
Regular chips	46	10.2
Milk	40	8.8
Cookies	33	7.3
Bottled water	29	6.4
Ice Cream	16	3.5
Cereal/granola bars	16	3.5
Sports drink	9	2.0
Sandwiches	5	1.1
Juice	5	1.1
Sweet Snacks	4	0.9
Minute Maid canned drink	4	0.9
Snack crackers	2	0.4
Tea	2	0.4
Total	446	98.5
+In the case of items, quantity refers to the number of instances that were found for the type of display (e.g., vending machine, shelving, cooler). Each product was not counted.		

Frequencies on instances of item displays showed that Large Drink Machines (for a fountain-type drinks) were the most common item display encountered (28%), followed by Other/Not Identifiable types of displays (e.g., trays, baskets, or displays that could not be identified; 16%), and counter wire shelves and smaller coolers (approximately 13% each) (Table 15). Ice cream coolers and vending machines were found less often (3% and 5%, respectively).

Table 15: Instances of Item Displays (indicating space available for items documented)

	Quantity	Percent of Total Displays
Large Drink Machine (for fountain-type drink)	120	27.8
Other or Not Identifiable	69	16.0
Counter wire shelves	58	13.4
Cooler ≤ 3 shelves	55	12.7
Tall wire shelves	42	9.7
Cooler ≥ 4 shelves	29	6.7
Clear plastic display (usually for cookies)	26	6.0
Vending machine	20	4.6
Ice cream cooler	13	3.0
Total	432	100.00

Frequencies were run to determine the number of times promotions were documented in halls, gyms, or cafeterias for ads and items (Table 16). Ads were found in cafeterias 58% of the time, in halls 35% of the time, and in gyms 8% of the time. Items were found most often in cafeterias (96%), followed by halls (4%) and gyms (0.2%).

Table 16: Ad and Item Location Prevalence

	Hall	Gym	Cafeteria	Total	Range	Average #
Ads (n=2021)	698	157	1165	2020	18-130	67.37
Items (n=453)	17	1	414	432	5-38	14.47
Total	715	158	1,579	2,453		
Range	1-70	1-23	1-84			
Average	23.87	5.27	52.63			

Frequencies were run to determine the prevalence of Commercial (instances that included products manufactured by a company under a particular name) and Noncommercial (instances that were not associated with a particular brand name) ads and items (Table 17). Of the identifiable ads and items, noncommercial ads were most prevalent (48%), followed by instances of commercial items (23%) and commercial ads (21%). Commercial beverages (for ads and items) were found in 30% of identifiable instances, while commercial food instances were found 15% of the time. Noncommercial beverage items were found the least (1.2%). See Appendix B for more detail on commercial and noncommercial criteria.

Table 17: Commercial vs. Noncommercial Instances (all identifiable ads and items n=2,200)

	Commercial		Noncommercial		Not Identifiable	
	Ads	Items	Ads	Items	Ads	Items
Food	134	194	931	148	1	1
Beverage	335	317	114	27	5	13
Total	469	511	1,045	175	5	14
All instances	980		1,220		19	

Frequencies were run to determine the prevalence of Direct (ads with an explicit message or commercial logo) and Passive (ads with nor specific message) ad communication (Table 18). Ads that contained passive instances of food (e.g., a picture of an apple with no words or explicit message) were found in 631 instances and direct promotions of food were found in 419 instances (e.g., an individual item promotion that advertises pizza for sale). Direct promotions of beverages (e.g., an ad for a specific drink,

such as Dasani water; signs that contained logos) were found in 431 instances, and passive instances of beverage promotion (e.g., an ad that displayed a picture of a milk carton with no specific brand associated with it or that did not explicitly promote milk) were found in 23 instances. See Appendix B for more detail on passive and direct communication criteria.

Table 18: Passive vs. Direct Ad Communication (identifiable instances n= 1,505)

	Passive	Direct	Not Identifiable
Food	631	419	16
Beverage	23	431	0
Total	654	851	16

Frequencies were run to determine the prevalence of visible commercial logo instances (Table 19). An indication of "No" meant that there was no logo present, even if a brand name was present. An indication of "Yes" meant that a commercial logo appeared. Ads and items were that had a "Not Applicable" designation were instances of noncommercial foods and/or beverages. Of the ads that were identifiable, 30% did not have visible commercial logos, and 70% had visible commercial logos. Of the items that were identifiable, 11% did not have a commercial logo visible, and 88% had commercial logos. See Appendix B for more detail regarding the coding protocol for visible commercial logos.

Table 19: Number of Instances of Visible Commercial Logos (weighted by ad/item quantity)

	Ads (identifiable ads n=647)			Items (identifiable items n=548)			Total
	Food	Beverage	All (% all ads)	Food	Beverage	All (% all items)	
No	143	50	193 (29.8%)	50	11	61 (11%)	254
Yes	132	322	454 (70.2%)	180	307	487 (88.9%)	941
Not Identifiable	1	10	11	3	15	18	29
Not Applicable+	790	73	863	110	24	134	997

+ indicates a noncommercial ad or item

Frequencies were run to determine the number of commercial brand name instances (Tables 20 and 21). Up to five food brand names and four beverages brands names could have been coded for each ad. Up to 7 brand names could have been coded for foods and/or beverages, each, for each item display. Brand names were coded for each food type. Brand names were coded as "multiple" in instances where there were multiple brand names present for a food type. Dasani was the brand documented most often for ads (119 instances), and Cool Tropics was the most commonly documented brand for items (74 instances). Cool Tropics is the primary brand name of the slushie/fountain-type drinks. However, results from this analysis are an

underrepresentation of certain brand names. Brands that were common, especially for items, were often included in the "multiple" categorization and are not reflected in the individual brand name frequencies. For example, if there was a vending machine with several different brands of regular chips, the items was coded for as "chips slow/whoa," and the brand was coded as "multiple." Therefore, the frequencies for certain brands (e.g., Doritos, Sunchips) are less than the number of times they were found in schools.

Table 20: Food Brand Name Frequencies

	Ads	Items
Blue Bell	3	14
Campbell's	2	
Chick-fil-a	4	
Cinnamon Toast Crunch	1	
DiGiorno	1	
Doritos	3	
Haribo	1	
Hot Pockets	1	
Juicy Fruit	1	
Krispy		2
Lunchables	13	
McDonald's	2	
M&M's	7	
Nature's Valley	3	
Otis Spunkmeyer	7	11
Pop Tarts	2	
Rice Krispie Treats		5
Skittles	2	
Sunchips	1	6
Trail's Best		2
Tyson	16	
Welch's		1
Multiples (>1 brand for the food/bev type coded within an ad or item display)	28	145

Table 21: Beverage Brand Name Frequencies		
	Ads	Items
Body By Milk	2	
Borden		51
Coca Cola	34	
Cool Tropics	40	74
Dasani	119	18
Dr. Pepper	1	
Gatorade	7	
Got Milk?	42	
HiC	1	
Iced D'Lites	8	15
Minute Maid	11	19
Nestea	1	
Nestle		11
Oak Farms		17
Ozarka	7	16
Pepsi	1	
Powerade	1	
RC Cola	16	3
Slurpie	2	
Snapple	8	
Sweet Leaf Tea		2
Tropicana		13
Tru Moo	5	14
V8 (all types)	1	12
Vita Fresh		4
Multiples (>1 brand for the food/bev type coded within an ad or item display)	18	23

Prevalence and Proportion of Healthy and Unhealthy Promotions

Frequencies were run to determine the prevalence of healthy and unhealthy ads and items as well as the proportions of each (Table 22). These were determined from summing all instances of healthy food and/or beverage types across all ads and items.

There could have been more than one food and/or beverage type coded for each ad or item instance. A total of 740 instances of healthy ads and 765 instances of healthy items were found. Unhealthy foods in ads were found in a total of 553 instances, and healthy foods in ads were found in 497 instances. Unhealthy and healthy items (foods and beverages) were found 447 times and 247 times, respectively. As was hypothesized, there was a higher proportion of unhealthy food and beverage promotions (55%), compared to healthy (45%), across schools. A chi-square test was performed to determine if healthy and unhealthy promotions were distributed differently across all schools. The test indicated a significant difference, X^2 (1) = 23.02, p<0.0001.

Table 22: Instances of Healthy vs. Unhealthy Promotions (n= 2,199)

	Ads	Items	Total	Proportion of Total Promotion Instances
Healthy				
Foods	497	94	591	
Beverages	243	153	396	
Total	740	247	987	45%
Unhealthy				
Foods	553	246	799	
Beverages	212	201	413	
Total	765	447	1,212	55%
Total			2,199	100.0%

School-Level Differences

T-tests were run to determine differences in ad and item quantity, number of unhealthy food and beverage types, number of commercial brands present, number of direct ad communications, and number of visible commercial logos in ads and items by economic disadvantage status (≥ 60% free/reduced lunch indicates more economically disadvantaged) and percent minority (≥ 75% minority indicates higher minority) at the school level. The mean percent of students who qualified for free/reduced lunch among the less economically disadvantaged schools was 33.4% (range 12-54%) (Table 23). The mean percent of students who qualified for free/reduced lunch among economically disadvantaged schools was 82% (range 62-97%). The mean percent minority for schools in the lower percent minority schools was 55% (range 35-72%), and in the higher percent minority schools it was 92% (range 83-99%).

Table 23: School-Level Descriptives

	Mean (%)	Median (%)	Range (%)
Economic Disadvantage[+]			
	33.4	33.0	12.0-54.0
Lower (n=13)	82.4	83.0	62.0-97.0
Higher (n=17)			
Percent Minority^ (75%)			
Lower (n=15)	54.8	52.0	35.4-72.3
Higher (n=15)	91.9	93.5	83.0-99.3

[+] Schools were categorized as being at higher economic disadvantage if <60% of students qualified for free/reduced lunch and as at lower economic disadvantage if ≥ 60% of students qualified for free/reduced lunch.

^ Schools were categorized as having a higher % minority if ≥ 75% of students were non-white and as lower % minority if < 75% of students were non-white.

Differences by Economic Disadvantage

Descriptive statistics for ad and item quantities by school level of economic disadvantage can be found in Table 24. For less economically disadvantaged schools, the mean number of ads was 73 (range 18-130), and the mean number of items was 6.5 (range 2-10). For higher economically disadvantaged schools, the mean number of ads was 63 (range 31-118), and the mean number of items was 5.5 (range 3-8).

Table 24: Ad and Item Quantity Differences By Economic Disadvantage and Percent Minority

	Ad Quantity			Item Quantity		
	Mean	Median	Range	Mean	Median	Range
Economic Disadvantage[+]						
	73.0	71.0	18-130	6.5	7.0	2-10
Lower (n=13)	62.6	55.0	31-118	5.5	5.0	3-8
Higher (n=17)						
Percent Minority^ (75%)						
Lower (n=15)	79.2	76.0	18-130	6.4	7.0	2-10
Higher (n=15)	55.5	54.0	31-96	5.47	5.0	3-8

[+] Schools were categorized as lower economically disadvantaged if <60% of students qualified for free/reduced lunch and as higher economically disadvantaged if ≥ 60% of students qualified for free/reduced lunch.
^ Schools were categorized as having a higher % minority if ≥ 75% of students were non-white and as lower % minority if < 75% of students were non-white.

Ad and item quantities differed significantly between lower and higher economically disadvantaged schools. Specifically, less economically disadvantaged schools had, on average, a greater number of total ads (*m*=86.9) than more economically disadvantaged schools (*m*=72.5) ($p<0.001$). Lower economically disadvantaged schools

had a significantly greater number of total items (*m*=7.3) than higher economically disadvantaged schools (*m*=5.9) ($p<0.001$) (Table 25).

Differences by economic disadvantage on the total number of foods and beverages found in ads were examined. A higher value on this variable indicates a higher number of unhealthy foods and beverages within all ads (possible score 0-9). There were no significant differences in the mean number of food and beverage types found in ads between lower and higher economic disadvantage groups.

Differences by economic disadvantage on the total number of foods and beverages found for items were examined. A higher value on this variable indicates a higher number of unhealthy foods and beverages within all documented items (possible score 0-14). There were significant differences in the mean number of food and beverage types in items between lower and higher economically disadvantaged schools (*m*=3.4 and 2.5, respectively) ($p<0.001$) (Table 25). Specifically, less economically disadvantaged schools had a higher average number of unhealthy foods and beverages items, as compared to more economically disadvantaged schools.

Differences by economic disadvantage on the average number of commercial brands documented for foods and beverages in ads were examined. A higher value on this variable indicates a higher number of commercial foods and beverage brands within all documented ads (possible score 0-9). There was a significant difference between lower and higher economically disadvantaged schools on the total number of commercial brands found in ads, in that lower economically disadvantaged schools had a higher mean

number of commercial brands in ads (*m*=1.52), as compared to the more economically disadvantaged schools (*m*=0.97) ($p<0.001$) (Table 25).

Differences by economic disadvantage on the average number of commercial brands documented for foods and beverages on items were examined. A higher value on this variable indicates a higher number of commercial foods and beverage brands within all documented items (possible score 0-14). There was a significant difference between lower and higher economically disadvantaged schools on the total number of commercial brands found in items, in that less economically disadvantaged schools had a higher mean number of commercial brands in items (*m*=5.33), as compared to more economically disadvantaged schools (*m*=3.07) ($p<0.001$) (Table 25).

Differences by economic disadvantage on the average number of direct communication in ads were examined. A higher score on this variable indicates a higher number of direct communication (versus passive) in food and beverage ads (possible score of 0-9). There was a significant difference between lower and higher economically disadvantaged schools in the total number of direct communication in ads, in that lower economically disadvantaged schools had a higher mean number of direct communication in ads (*m*=2.69), as compared to more economically disadvantaged schools (*m*=2.46) ($p<0.001$) (Table 25).

Differences by economic disadvantage on the average number of visible commercial logos in ads were examined. A higher score on this variable indicates a higher number of visible logos in food and beverage ads (possible score of 0-9). There

was a significant difference between lower and higher economically disadvantaged schools in the total number of visible logos in ads, in that lower economically disadvantaged schools had a higher mean number of visible logos in ads (*m*=2.23), as compared to higher economically disadvantaged schools (*m*=1.48) ($p<0.001$) (Table 25).

Differences by economic disadvantage on the average number of visible commercial logos in items were examined. A higher score on this variable indicates a higher number of commercial logos in documented items (possible score of 0-14). There was a significant difference between lower and higher economically disadvantaged schools in the total number of visible logos in items, in that lower economically disadvantaged schools had a higher mean number of visible logos in items (*m*=5.26), as compared to higher economically disadvantaged schools (*m*=3.51) ($p<0.0001$) (Table 25).

Differences by Percent Minority

Descriptive statistics for ad and item quantities by percent minority can be found in Table 24 (above). For lower percent minority schools, the mean number of ads was 79 (range 18-130), and the mean number of items was 6 (range 2-10). For higher percent minority schools the mean for ads was 55.5 (range 31-96), and the mean number of items was 5.5 (range 3-8).

Ad and item quantities differed significantly between lower and higher percent minority schools. Schools with a lower percent minority had a significantly higher average number of total ads (*m*= 92.6) than schools with a higher percent minority

(*m*=60.3) ($p<0.001$). Item quantities were significantly higher for lower percent minority schools (*m*=7.1), as compared to higher percent minority schools (*m*=5.9) ($p<0.001$) (Table 25).

Differences by percent minority on the total number of foods and beverages found in ads were examined. A higher value on this variable indicates a higher number of unhealthy foods and beverages within all ads (possible score 0-9). Lower percent minority schools had a significantly higher number of unhealthy foods and beverages in ads (*m*=3.0), as compared to higher percent minority schools (*m*=2.6) ($p<0.001$) (Table 25).

Differences by percent minority on the total number of foods and beverages found for items were examined. A higher value on this variable indicates a higher number of unhealthy foods and beverages within all documented items (possible score 0-14). There were significant differences in the average number of food and beverage types in items between lower and higher percent minority schools. Specifically, schools with a lower percent of minority students had a higher average number of unhealthy food and beverage items (*m*=3.5), as compared to higher percent minority schools (*m*=2.4) ($p<0.001$) (Table 25).

Differences by percent minority on the average number of commercial brands documented for foods and beverages in ads were examined. A higher value on this variable indicates a higher number of commercial foods and beverage brands within all documented ads (possible score 0-9). There was a significant difference between lower

and higher percent minority on the average number of ad commercial brands (*m*=1.4 and 1.0, respectively) ($p<0.001$) (Table 25). This indicates that schools with lower percent minority had a higher average number of commercial brands in ads, as compared to higher percent minority schools.

Differences by percent minority on the average number of commercial brands documented for foods and beverages in items were examined. A higher value on this variable indicates a higher number of commercial foods and beverage brands within all documented items (possible score 0-14). There was a significant difference between lower and higher percent minority on the average number of item commercial brands (*m*= 5.3 and 2.8, respectively) ($p<0.001$) (Table 25). This indicates that schools with lower percent minority had a higher average number of item commercial brands, as compared to higher percent minority schools.

Differences by percent minority on the average number of direct communication in ads were examined. A higher score on this variable indicates a higher number of direct communication (versus passive) in food and beverage ads (possible score of 0-9). There was a significant difference between lower and higher percent minority on the average number of direct ad communication (*m*=2.7 and 2.4, respectively) ($p<0.001$) (Table 25). This indicates that schools with lower percent minority had a higher average number of instances of direct ad communication, as compared to higher percent minority schools.

Differences by percent minority on the average number of visible commercial logos in ads were examined. A higher score on this variable indicates a higher number of

visible logos in food and beverage ads (possible score of 0-9). There was a significant difference between lower and higher percent minority on the average number of visible logos in ads (*m*=2.08 and 1.49, respectively) ($p<0.001$) (Table 25). This indicates that schools with lower percent minority had a higher average number of ads with visible logos, as compared to higher percent minority schools.

Differences by percent minority on the average number of visible commercial logos in items were examined. A higher score on this variable indicates a higher number of commercial logos in documented items (possible score of 0-14). There was a significant difference between lower and higher percent minority on the average number of visible logos in items (*m*=5.3 and 3.21, respectively) ($p<0.001$) (Table 25). This indicates that schools with lower percent minority had a higher average number of items with visible logos, as compared to higher percent minority schools.

Table 25: Differences at the School Level in Promotion Prevalence and Types				
	Economic Disadvantage[+]		Percent Minority^	
	Lower	Higher	Lower	Higher
Total Number of Ads				
Mean	86.88	72.47	92.58	60.33
SD	29.93	27.68	29.24	17.39
p value	<0.001		<0.001	
Total Number of Items				
Mean	7.25	5.93	7.12	5.90
SD	1.87	1.45	1.82	1.50
p value	<0.001		<0.001	
Unhealthy Food & Beverage Types in Ads	2.86	2.79	2.98	2.6
Mean	1.10	1.15	1.13	1.09
SD	0.140		<0.001	
p value				
Unhealthy Food & Beverage Types in Items	3.42	2.54	3.47 1.12	2.36
Mean	1.11	0.87	<0.001	0.64
SD	<0.001			
p value				
Commercial Brands Present in Ads				
Mean	1.52	0.97	1.36	1.04
SD	0.87	0.55	0.86	0.57
p value	<0.001		<0.001	
Commercial Brands Present for Items				
Mean	5.33	3.07	5.27	2.82
SD	1.79	1.17	1.72	0.95
p value	<0.001		<0.001	
Direct Communication Instances for Ads				
Mean	2.69	2.46	2.71	2.36
SD	1.43	1.48	1.47	1.42
p value	<0.001		<0.001	
Visible Commercial Logos in Ads				
Mean	2.23	1.48	2.08	1.49
SD	0.98	0.55	0.94	0.60
p value	<0.001		<0.001	
Visible Commercial Logos for Items				
Mean	5.26	3.51	5.3	3.21
SD	1.73	1.51	1.69	1.29
p value	<0.001		<0.001	

[+] Schools were categorized as less economically disadvantaged if <60% of students qualified for free/reduced lunch and as more economically disadvantaged if ≥ 60% of students qualified for free/reduced lunch.
^ Schools were categorized as having a higher % minority if ≥ 75% of students were non-white and as lower % minority if < 75% of students were non-white.

5.5 Discussion

Coding Reliability

Level 2

Overall, excellent inter-rater coding reliability was established in the current study. This is a positive finding, given that a coding template and protocol to examine direct observation data from a new electronic tool did not previously exist. The new coding protocol may be used in the future with more than one rater to quantify pictures and descriptions of food and beverage promotions that can be documented from the new electronic data collection tool.

One of the few discrepancies between coders was with records that included more than one picture/description of a similar type of ad (e.g., hanging passive food signs). It was unclear if each type of food/beverage needed to be coded for and, if so, how to count the quantities so as not to over/under represent the number of ads and/or individual foods/beverages present. In general, the original quantity category was adjusted to accurately reflect the number of each foods/beverages. There was a discrepancy between coders on quantity fields in a few instances because one coder combined or divided records that were similar and the other coder did not. This was discussed and coders determined that no records should be combined or split at the coding stage. Quantity fields should be adjusted in future versions of the coding template, or a strict guideline should be developed, in order to minimize possible discrepancies between coded files.

Another instance where there was a discrepancy between coders resulted because of the need to clarify the Ad Communication criteria (i.e., direct or passive).

Clarification was needed on how to code certain main categories (such as Nutrition Education) so that coders did not have to split records to appropriately code everything.

In order to address this, the protocol was updated to include more detail for category definitions and instructions for specific situations. Also, we added the "student-made" categorization to the protocol to address frequent discrepancies between coders on these types of promotions. The "Specific Area where ad is found" category was not useful and resulted in some discrepancy between coders. It did not appear that anything was gained by including this field, because categories were vague and were not consistently coded.

Few discrepancies in the coding process were found between raters using the newly developed coding system, thus multiple coders can use the new coding template in the future to expedite data coding. The coding procedure may be useful for future studies that aim to code and analyze similar types of data collected in schools and in other environments where food and beverage promotions are be present.

Direct Observations

Types of food/beverage promotions

Analyses on direct observation data revealed that food and beverage promotions are prevalent in central Texas middle schools, and that certain characteristics (e.g., direct

communication, visible logos, brand names) of promotions commonly occur on these promotions. In the current sample, all 30 schools had instances of food/beverage promotion, with 2,021 total advertisements and 453 total item instances across all schools. These numbers are higher than found in a previous study, the California (CA) Project LEAN, which examined food and beverage marketing in high schools. Specifically, posters and signs were found in 18 of the 20 schools that were assessed, with a total of 245 instances (this study did not collect data on items) (Craypo et al., 2006). Across all food and beverage signs and posters, 49% contained nutrition education messages (versus 29% in the current study) and 51% advertised a specific product or brand (versus 25% in the current study). The higher prevalence of total advertisements in the current study may be due to differences in prevalence of food and beverage promotions between middle- and high schools. There may be more types of individual food promotions in middle schools because students are potentially making more food-related decisions in school since most middle schools are closed campuses (i.e., students cannot leave campus for lunch) and some high schools do allow students to leave. A higher prevalence of nutrition education in middle schools may be due to the prioritization of this type of curricula with younger, versus older, students. Perhaps differences in the percentages for nutrition education and individual item promotions are due to slight differences in categorizations of ads. For instance, the current study included additional categories (i.e., Fuel Up and Play 60) that could have been considered Nutrition Education ads in the CA Project LEAN study. However, limited details have

been reported for the CA Project LEAN assessment tool, thus it is difficult to determine where specific differences lie.

Another study used an adapted version of the CA Project LEAN instrument to assess food and beverage marketing in 36 schools in the Montgomery County, Maryland Public School District. Assessments were conducted in elementary (n=24), middle (n=6), and high schools (n=6), and food/beverage signs and posters were found in 83% of all schools (70% of elementary, 100% of middle, and 83% of high schools) (CSPI, 2008). Similar to previous research and the current study, results showed a combination of posters and signs for individual products (e.g., Little Debbie snacks) and nutrition education signs. While the prevalence of nutrition education ads is a positive finding, the fact that individual item promotions (often for commercial and/or less healthy products) tend to have equal presence is potentially problematic. It is possible that messages presented in nutrition education posters are less effective if they are contradicted by other individual item promotions in the same setting.

In the current study, items in cafeterias, gyms, and halls were documented, and results showed that regular chips, cookies, sweet snacks, and snack crackers represented a total of 22% of all documented items. Sugary drinks (e.g., slushie/fountain-type drinks, sports drinks, canned juice drinks, tea) accounted for about 31% of all items documented. Water, 100% juice, and milk represented about 16% of all items documented. Previously, the Montgomery study documented only types of products that were in vending machines. Results showed that in snack vending machines that were found in schools,

foods such as candy, cookies, crackers, and regular chips were most common (each found in just over 80% of all snack vending machines). In beverage vending machines (about 70% of all vending machines), sugary drinks (including soda and fruit drinks) and high fat milk were found in 59% of machines in middle schools. Healthier items (e.g., water, 100% juice, and low-fat milk) were found in 61% of machines in middle schools. Results between these two studies should be compared with caution, though, since the Montgomery study did not document all products and categorized vending machines as snack or beverage.

In the current study, a total of 20 vending machines were found across all schools, which is less than previous data from high schools show. Specifically, CA Project LEAN found 276 vending machines across 19 schools, however locations of vending machines appear to be similar across samples (most predominant in cafeterias and halls) (Craypo et al., 2006). The Montgomery County study found that 15 of the 36 schools (42%) had a total of 166 vending machines, and 100% of middle- and high schools had vending machines. California and Maryland do not have a policy in place to decrease or eliminate vending machines in schools, but stipulate types of foods and beverages could be sold in schools. Similarly, the Texas policy does not ban vending machines, but proposes a cap on the amount of unhealthy foods and beverages that may be sold and limits the times of day when vending machines may be accessed. Differences in current and previous findings may be due to city and/or district-level differences in policy implementation and adherence.

In the current study, most ads and items were found in cafeterias (64%), followed by halls (29%) and gyms (6%). Previous results show the majority of food and beverage signs and posters were in cafeterias - 81 total ads in 13 out of 20 schools were found in this location (Craypo et al., 2006). However, the same study found that the next most prevalent places were scoreboards (that were likely in gyms), classrooms, and clinics (the latter two were not assessed in the current study), followed by hallways. Specifically, they found 10 advertisements in 5 schools, versus the 715 ads and items that were documented in all 30 schools in the current study. The Montgomery County also found the majority of advertisements in cafeterias, with school entrances and halls as the next prevalent location, followed by gyms (CSPI, 2008). These results are similar to the current study, however quantities differed. Specifically, the Montgomery study had some schools that had zero advertisements in cafeterias and halls, whereas current study results showed at least one advertisement in all locations across all schools. This is notable, as it is possible that advertisements in cafeterias may influence students' food and beverage choices more so than advertisements in other locations, since cafeterias are likely where most food-related decisions are made in schools. Future studies should examine the possible relationships between promotions that are present in cafeterias and students' food and beverage choices in the same location.

In the current study, commercial brand logos were documented in every school, and were found in 70% of all commercial food ads and in 89% of commercial items. A previous study documented only those logos that appeared on equipment, such as coolers

and display cases, cups and napkins, PE equipment, and uniforms. However, results showed that the most frequently documented logos were on coolers and display cases (found in 12 schools) and cups, napkins, and plates (found in 7 schools) (Craypo et al., 2006). The presence of commercial logos in schools has been associated with students' food and beverage consumption habits. Specifically, previous research has shown that students who report food and beverage logos in their schools were more likely to consume candy and salty snacks (Minaker et al., 2011). The higher prevalence of unhealthy food and beverage promotions in the current study, in conjunction with the high prevalence of commercial logos, could have negative effects on students' food and beverage choices in the current sample. It is important to examine this potential relationship more closely in future studies, and it may be necessary to include policies that specifically address limiting commercial logos in schools.

In the current study the most common brand names that were documented for ads and items were Dasani (n=119), Cool Tropics (n=114), Borden (n=51), and Coca-Cola (n=34). It is positive that a bottled water brand was most commonly found in the current study, in that it promotes the healthy habit of drinking water. However, it is discouraging that Cool Tropics, the brand for slushie-type drinks (not 100% juice), was found almost as often. Given previous research (CSPI, 2008), the prevalence of Coca-Cola branded ads and items is not surprising. However current study estimates likely under represent the number of some brands, as the "multiple" brand designation was used often for describing instances where more than one brand was present. The Montgomery study

found PepsiCo and Coca-Cola to be the most commonly advertised brands on vending machine exteriors (on 60 machines and 40 machines, respectively) (CSPI, 2008). Another study showed that corporations had advertising activities in 83% of schools (Molnar et al., 2006). The high prevalence of commercial brand names may contribute to increased energy intake and weight status, given pilot study results regarding associations between brand recognition and energy intake among children (Forman, Halford, Summe, MacDougall, & Keller, 2009). Specifically, children's ability to name brands was significantly and positively associated with energy intake among overweight, as compared to non-overweight, children. It is possible that overweight children are disproportionately affected by branded food and beverage promotions, which is disconcerting given the high prevalence of overweight children.

Prevalence and Proportion of Healthy and Unhealthy Promotions

There were more unhealthy promotions than healthy in the current study (55% vs. 45%), which is similar to previous findings. Specifically, the CA Project LEAN study found that 60% of signs/posters that advertised specific products were for "discouraged" (i.e., unhealthy) foods and beverages, and about 28% were contained healthy product promotions. Although the CA Project LEAN was conducted in high schools, these data reflect similar trends found in the current study, in that there appeared to be a higher prevalence of unhealthy food/beverage promotions in schools. Molnar et al. (2006) conducted analyses on a national survey of district schools officials from 391 U.S. schools and found that advertising in schools is primarily for FMNV, and unhealthy types

of foods were more heavily advertised in schools than healthier foods. Specifically, 67% of schools had advertising for foods high in fat and sugar. Pasch and colleagues (2011) found that vending machine foods that were present in a sample of 116 Minnesota schools were predominantly unhealthy. Specifically, the proportion of sugar-sweetened and sports beverages were represented 57% of beverages offered in middle school vending machines. Salty snacks represented 40% of all items offered in vending machines in middle schools, followed by candy bars (39%), and cookies/baked goods (17%) (Pasch et al., 2011). Alternatively, the Montgomery County study found healthier items slightly more often (in 61% of machines) than unhealthy items (in 59% of machines). This same study found that elementary schools had the highest prevalence of healthy foods in advertisements (55% of all ads), followed by middle schools (40%) and high schools (18%).

The current study finding that there were significantly more unhealthy food and beverage promotions than healthy is disconcerting. This indicates that central Texas middle school students are being exposed to predominantly unhealthy items, which could potentially influence their food and beverage choices. Given the current childhood obesity problem, it is necessary to determine ways to decrease unhealthy food choices and/or increase healthy choices.

School-level Differences

Less economically disadvantaged schools had higher quantities of food/beverage promotions, unhealthy types of items, commercial brand instances, direct communication

in ads, and visible commercial logos. There was no difference between school-level economic disadvantage and level of unhealthy foods and beverages found in ads. Schools with a lower percent of minority students had higher levels of food/beverage promotions, unhealthy types of promotions, commercial brand instances, direct communication in ads, and visible commercial logos.

Overall, these results were surprising, given that previous research suggests lower SES groups are exposed to greater amounts of advertising (Delva, Johnston, & O'Malley, 2007), higher levels of food and beverage advertising are viewed by minority groups (Powel et al., 2007), and that promotion of unhealthy foods is disproportionately aimed at some minority groups (Grier & Kumanyika, 2008). Differences in obesity determinants have been examined in an attempt to identify why economically disadvantaged and minority groups are disproportionately affected. With regard to the school environment, it has been proposed that lower SES schools may be more dependent on, and may be more apt to allow, incentives provided by commercial food companies than higher SES schools (Palmer et al., 2004). Additionally, the current study hypothesized that higher levels of food and beverage promotions may be found in economically disadvantaged schools, because stakeholders in less economically disadvantaged schools often have more resources to implement positive changes in the school food environment. Thus, the unexpected results should be further examined.

In a cross-sectional, nationally representative sample of 395 U.S. public schools, Finkelstein et al. (2008) examined variations in school food environments according to

school-level characteristics. A food summary score was created from various school environmental aspects and/or policies, such as availability of competitive foods and beverages and whether or not fresh fruit was offered daily. A higher score (maximum = 17) for school food environments and policies (SFEPs) indicated a healthier school. There was no significant relationship found between the food summary score and the percentage of students who qualified for free/reduced lunch. Interestingly, SFEP scores were higher (indicating a healthier school environment), for schools with a higher number of students who qualified for free/reduced lunch (i.e., low SES schools). Although the differences in SFEPs by SES level were not significant, the trend is similar to current study findings. Overall, differences between levels of percent minority followed the same trend as current study results. Specifically, schools with a low percentage of minority students had a lower SFEP score (7.7), as compared to medium- (8.8) and high- (9.2) percent minority schools. SFEP score differences between low- and high percent minority schools were significant, differences between low and medium approached significance, and differences between medium and high were not significant.

Turner and Chaloupka (2012) examined the availability of competitive foods in 2,647 public and 1,205 private elementary schools and possible associations with characteristics, such as access to certain competitive food venues and availability of some products. Results showed that school SES level (percent of students who qualified for free/reduced lunch) was not significantly associated with students' access to competitive food venues (e.g., vending machine, a la carte line) or with the availability of products in

those venues (e.g., salty, low-fat, sweet, and healthy items), with the exception of healthier options. Lower SES schools had significantly less availability of healthier products than medium- and high SES schools. This same study found that school-level racial/ethnic composition was not significantly associated with access to venues or available products. This study did not directly measure food/beverage promotions (e.g., advertisements, visible logos), however, at the least, results may help to dispel the idea that schools food environments vary drastically by SES level. Specifically, the fact that few differences were found between high and low SES schools and no differences were found for percent minority does not support previous hypotheses that lower SES students are disproportionately exposed to food/beverage promotions.

Delva and colleagues (2007) examined how the availability of healthy and unhealthy food choices in schools and whether or not potential differences in this availability was associated with SES and race. Data from a nationally representative sample of over 37,000 students in 345 secondary schools were examined, and showed no significant differences in the percentage of schools with pouring contracts by school SES status or race/ethnicity. Although pouring contracts were not directly measured in the current study, it is one measure of food/beverage promotions in schools and may explain the presence of certain products and advertisements. The Delva et al. study also found few differences in students' access to healthy and unhealthy foods by race/ethnicity of the schools, however results did not mirror those in the current study. Specifically, in that

study, White students had greater access to healthier options (low-fat salty snacks and cookies, and pastries) than did African American students.

Perhaps commercial food and beverage companies are targeting less economically disadvantaged schools, because these students may have higher discretionary funds to purchase products than those in economically disadvantaged schools. Additionally, it is possible that in economically disadvantaged schools students' food and beverage choices may be less affected by in-school promotions, as this group tends to be more dependent on free/reduced lunches through the National School Lunch Program, which does not include many a la carte items.

It is possible that less economically disadvantaged schools have not implemented measures necessary to decrease the amounts and types of food/beverage promotions in schools if stakeholders do not believe that wealthier students are vulnerable to promotions. Perhaps parents in less economically disadvantaged schools believe they can buffer potential negative effects of food and beverage promotions on students' behavior by purchasing healthier products for home and packed lunches. Therefore they may not feel that it is necessary to decrease the amount/type of promotions in schools.

It is also possible that the school-level economic disadvantaged indicator used in the current study (percent of students who qualified for free/reduced lunch) is not reflective of more complex factors that may be associated with food and beverage promotions in schools, as has been suggested by others (e.g., Finkelstein et al., 2008). Future research should examine additional socioeconomic factors that may be associated

with food and beverage promotion in schools, including parental education and income, and students' discretionary funds.

Overall, results in the current study suggest that lower economical disadvantage and lower percent minority are associated with the more food and beverage promotions in middle schools, which is unexpected. It is possible that efforts to change the school food environment have been primarily devoted to populations that are traditionally marginalized (i.e., economically disadvantaged and higher percent minority). In turn, food companies may more heavily target wealthier and predominantly white schools, than was previously thought. Future research should examine if the possible disproportionate levels of food and beverage promotions affect students' food and beverage choices and weight-related outcomes. Additional factors that may protect less economically disadvantaged and lower percent minority populations from potential detrimental effects of food promotions (e.g., parental income and education, youth access to certain foods at home, screen time) should also be investigated.

Chapter 6

Discussion

Due to the high prevalence of obesity among children, it is necessary to continue to investigate possible determinants of food and beverage choices and weight-related outcomes in an attempt to curtail the problem. Food and beverage advertising is one area that may contribute to obesity among kids, as commonly advertised foods are typically unhealthy (Powell et al., 2007). Additionally, food marketers include aspects in promotions that are appealing to youth (IOM, 2006), and spend a significant amount of money advertising in locations where youth spend time (FTC, 2012; IOM, 2006). Specifically, there is evidence that food and beverage promotions are prevalent in schools (Whatley et al., 2011) and that promotions are associated with students' consumption of unhealthy foods (Minaker et al., 2011). Examples of possible theoretical explanations for advertising effects on youth include the effect of exposure and priming. Specifically, individuals may prefer stimuli that they have been exposed to numerous times over stimuli they have experienced less (Harrison, 1977), and preferences for foods may develop from repeated exposure to products and/or messages, even if the consumer is unaware of such messages (Harris et al., 2009).

However, food and beverage promotions in schools have been understudied, particularly in middle schools, which is potentially problematic for several reasons. For instance, children spend significant amounts of time in schools and make decisions about

what foods and beverages to purchase and consume in this environment. In-school food and beverage promotions may contradict nutrition education messages presented in the same environment. Additionally, students may view in-school product promotions as inherently healthy (Hesketh et al., 2005), and as endorsed by school staff (Palmer et al., 2004). One reason there is a lack of research on food and beverage promotions in schools may be due to insufficient data collection tools. Specifically, existing tools are pencil/paper measures, primarily dependent on school staff reports, and may be inefficient to use in the school environment.

The current study established a new, reliable electronic tool that can be used to assess food and beverage promotions in middle schools. Both intra- and inter-rater reliability were found to be sufficient, and thus, the instrument may be used in future studies that aim to collect objective environmental data on food and beverage promotions in schools. The fact that the new tool may be used with more than one rater is a positive finding, as it indicates that multiple data collectors may be used in future, larger studies. Multi-site data collections (that may depend on several data collectors) would be beneficial for replicating or furthering current study results to better describe the school environment.

The establishment of the new tool extends the current body of literature, as a comparable tool did not previously exist. Existing tools (e.g., CSPI, 2008; Craypo et al., 2006) were limited to pencil/paper methods and did not have capabilities to take pictures and directly link them to descriptive data. The current tool is efficient and may minimize

error in data collection, as well as reduce the steps necessary for data collection and entry. Additionally, previous instruments have relied primarily on reports from school staff and did not accurately capture the presence of commercial logos.

Another positive result from the current study is the development of an effective and reliable coding template and protocol that may be used to code and quantify data collected with the new electronic tool. A comparable coding procedure did not exist prior to the current study. Additionally, the excellent inter-rater reliability that was established indicates that future studies may effectively use multiple coders, which may improve efficiency with the coding process.

The current study's findings from direct observations in middle schools are noteworthy, because of the current lack of direct observation data on middle school food environments and because they bolster the idea that children are exposed to significant amounts of food and beverage promotions in school. These promotions may contribute to decisions about food and consumption habits that affect weight status. Due to financial relationships between schools and commercial food and beverage companies that often accompany in-school promotions, it may be difficult to eliminate this type of marketing. Steps to address this might include implementing policies to reduce or prohibit schools' financial gain from food and beverage promotions and to find alternative ways for schools and districts to supplement their income.

In an attempt to change the current state of food and beverage advertising aimed at children, the Children's Food and Beverage Advertising Initiative (CFBAI) was

formed to facilitate changes in advertising to children under the age of 12 to promote healthy dietary choices (CFBAI, 2013). Although this is a step in the right direction, currently the program is self-regulated, voluntary, includes only 16 companies and restaurants, focuses mainly on televised advertising, and does not necessarily reach students over the age of 12. In light of the current study's findings on the prevalence of food and beverage promotions in middle schools and previous findings regarding how these promotions may affect dietary behaviors (e.g., Minaker et al., 2011), it is necessary to extend the initiative. If possible, more companies should be involved and should attempt to limit food and beverage promotions across multiple venues, particularly in schools.

As of February 2012, the policies for in-school food and beverage promotions in Texas schools have been limited. Specifically, guidelines were posed for middle schools to eliminate the sale of competitive foods, including those sold in vending machines, school stores, or as part of school fundraisers, that compete with schools' NSLP to students during meal periods. However, the new guidelines do not include foods and beverages that are provided by school food services, which often include foods of minimal nutritional value. For example, promotions documented through direct observations in the current study included products such as slushie/fountain-type drinks, Doritos, and Blue Bell, all of which are considered FMNV, yet are sold through school food services. Furthermore, even if there were sufficient regulations on the accessibility of certain products, the existing guidelines do not currently address the other potential

negative aspects of products' presence in schools. For instance, commercially branded products and those that exhibit logos may have effects on students' dietary behaviors due to mere exposure, or students' becoming accustomed to a certain "landscape". Future studies should address the possibility that product presence, independent of accessibility guidelines, may impact food and beverage choices and consumption both within and outside of the school environment.

Maibach and colleagues (2007) propose a "people and places" framework that acknowledges the link between individuals and their environments. This framework incorporates categorizations of place-based influences, originally developed by Cohen, Farley, and Scribner (2000), which include the availability of products and services, the physical structures in the environment, social structures in communities, and media and cultural messages in our environment. Specifically, the framework posits that marketing communication (or promotion) affects these five levels of influence, which may be important in advancing healthy behavior changes. Although future studies should examine the link between objective environmental data in schools and individual characteristics and behaviors, it is likely, as posited by this framework, that in-school food and beverage promotions can influence behavior. If such a relationship were found, it would provide support for policies that limit the posting of unhealthy food and beverage advertising in schools and promote the posting of advertising for healthy foods and beverages.

In summary, the current study provides much needed objective data on middle school food and beverage promotions, broadly defined to include both advertising and product promotions. The current findings are beneficial for describing the environment in which children spend a significant amount of time. As previous research supports associations between food/beverage promotions in schools and food/beverage purchases (Mazur et al., 2008), dietary intake (Briefel et al., 2009), and other obesity-related outcomes (Minaker et al., 2011), it is necessary to build upon these results by exploring possible similar relationships. Specifically, environmental data from the current study may be used to examine associations between the instances of food/beverage promotions and food/beverage choices, preferences, and other obesity-related outcomes among students. Due to the limited research among middle school students, future studies should explore these possible relationships among this population in central Texas and other geographical areas.

Chapter 7

Limitations and Strengths

Overall, this study has several strengths, and extends the research on in-school food and beverage promotions. However, some limitations should be acknowledged. For example, additional fields, descriptors, and layout options for the new electronic tool were determined after data collection had begun. Thus further tweaking of the new electronic tool may be necessary in the future. Additionally, data collectors were unable to take pictures if students were in the vicinity of signs and products of interest. Although detailed notes were taken of what was encountered when a photo could not be taken, it was difficult to compare instances of promotions without pictures for each instance. Due to scheduling limitations and individual school scheduling constraints, data collectors were unable to adhere to a strict protocol for the time of day in which data were collected. Different amounts of food and beverage promotion may have been documented depending on the time of day data were collected. Due to limited research staff, data collection took several weeks to complete. As was expected, there were variations in the school environment depending on the time data were collected. For instance, standardized testing took place during some of the data collection sessions, and part of the testing protocol is for all signs to be removed from the walls in schools. Some schools adhered to this guideline more strictly than others, therefore there was some variability in the amount of signs present in schools during this time period.

Data collectors were told by schools staff in several schools that students oftentimes tear down signs in the halls, gyms, and cafeterias. Additionally, some of the schools had annex buildings and halls that were not documented for signs or products, as these locations were not considered representative of main halls. These issues indicate that students may be exposed to certain type of food and beverage promotion that were not documented. The direct observations took place in 30 schools in one area of Texas, thus data may not be representative of other areas in Texas or the U.S., and results may not be generalized to all middle schools. Analyses at the school district level were not possible, due to the limited number of schools from some districts and the uneven representation across districts. Future studies should explore differences across school districts, which may reflect differing policy environments, as districts often set the policies for all schools.

A strength of the current study is the establishment of an efficient, electronic tool to measure the school environment. This is particularly important for collecting data in schools, as it is necessary to be discreet and minimize time spent in this environment. The ability to take pictures and directly link photos with descriptions are strengths, as well as the ability to collect, enter, and manage data in the same program (i.e., FileMaker). The fact that the new tool demonstrated good intra- and inter-rater reliability is a strength, as a comparable tool did not exist prior to the current study.

Little objective data exist on food and beverage promotion in schools, therefore the direct observation data collected provide a unique, unbiased view of this aspect of the

school environment. Previous studies have focused primarily on high schools, with less work in elementary and middle schools. The current study's focus on middle schools is also a strength, especially because middle school students represent a unique population who are exposed to food and beverage marketing in schools that are primarily closed campuses, at a time when they are starting to gain more freedom and have greater discretionary funds. Given that the limited previous research on middle schools has been with smaller samples, the large sample size of 30 middle schools in the current study is a strength, Additionally, the variation in SES and percent minority distributions among this sample is an advantage, in that it provides another perspective on middle school food environments. Despite some limitations, the current study advances research by providing a new direct observation data collection tool and important information regarding middle school food environments.

Chapter 8

Conclusions and Implications

The primary goals of this dissertation were to 1) assess the reliability of a new electronic tool to measure food/beverage and physical activity promotion in schools, and 2) investigate the prevalence and type of food and beverage promotion in middle schools. Unique components of this dissertation include the use of an innovative data collection instrument and direct observations of the school environment by research staff. Most previous research regarding food and beverage advertising has focused on television advertising exclusively (IOM, 2006) or has not included packaged products with commercial logos as a form of promotion in the school setting.

The current study found that a new electronic tool to assess in-school food and beverage promotions is reliable across time points and with multiple data collectors. Additionally, a new coding protocol to categorize direct observations was developed and was found to be reliable between coders. Finally, direct observation results show that food and beverage promotions are present in central Texas middle schools, and may differ by school-level characteristics such as economic disadvantage and percent minority. Specifically, as compared to more economically disadvantaged schools, less economically disadvantaged schools had significantly higher numbers of the following: food/beverage promotions, unhealthy food/beverage types, commercial brands present, direct ad communications, and visible commercial logos. Lower percent minority schools showed similar, significant patterns, as compared to higher percent minority schools.

Results from this study may inform future studies that aim to examine in-school food and beverage environments. Future research directions may include using the new electronic tool to assess food and beverage promotions in additional aspects of schools, including promotions found in fundraising events, in classrooms, and on school buses. Other food and beverage promotion outlets where youth spend substantial time, such as movie theaters and malls, may be examined in future studies in order to gain a better perspective on the types and amounts of promotions youth may be regularly exposed to. If possible, district-level differences in food and beverage promotions should be accounted for in future studies. Additional research should be done to examine possible links between food and beverage promotions (e.g., types, prevalence) in schools and obesity-related outcomes, such as food and beverage consumption and body mass index. Ultimately, if positive associations are found between food/beverage promotions and students' food choices and weight status, interventions that target the school environment as a means to decrease overweight status and associated determinants among children may benefit from this and future study's results. Moreover, the CATCH program, and similar comprehensive health measures, might demonstrate even greater success if the school environment reinforces messages presented by school staff and parents. Multi-level intervention approaches would likely be most effective, such as strategies to raise awareness among parents, teachers, and principals regarding types of food and beverage promotion and how it may affect students' health.

The current study and others that build upon it may be useful to policy makers. Given the current system of food and beverage advertising voluntary self-regulation and the variability in regulation between school districts, current study results regarding food and beverage promotions may be used to inform stronger advertising regulation policies. Specifically, policy implications may include state or federal mandates to limit the amount and type of food and beverage promotions permitted in middle schools. Additionally, policies should address advertising regulation system reform in order to decrease the marketing of unhealthy foods and beverages to youth in environments where they are required to spend great amounts of time. Furthermore, policy changes to decrease food and beverage promotions may be necessary in schools that are economically advantaged, rather than economically disadvantaged schools, given the current study's findings. Policy implementation may need to be tailored at the district-level in order to address economic and demographic variations in promotions, such as those found in the current study. Policy makers should also address monitoring of district- and school-level adherence to current and future food and beverage promotion policies in schools in order to maximize the positive effects of these types of policies.

Practitioners may use the current study results in the future. For instance, the new electronic tool that was developed and found to be reliable may be adapted for use with a lay population, such as teachers, food service workers, or parents. Specifically, school stakeholders and groups that aim to improve students' health (e.g., Student Health Advisory Committees [SHACs], Parent Teach Associations [PTAs]) may find the new

tool useful. If properly trained, members of these types of organizations could document their individual schools' food and beverage environments, rather than depending on outside researchers. Students may also be able to take part in documenting their school environments and, in turn, may feel more empowered to help shape their surroundings. District-level dietitians, health teachers, and school nurses, who all work to promote students' health, may find the current study results useful in helping them to better assess schools, specifically in identifying possible barriers to healthy eating, as well as dissemination of health-related materials. These types of projects may help to more efficiently improve aspects of the school environment related to food and beverage promotions by using a bottom-up, rather than a top-down, approach. Perhaps such projects can help inform some of the aforementioned advances in policies that aim to decrease certain types food and beverage promotions.

Given the importance of identifying effective intervention strategies to reduce childhood obesity rates and the lack of in-school food and beverage promotion measures and objective environmental data, this project extends the body of literature related to these areas.

Appendices

APPENDIX A

CATCH School Health Promotion Observation Checklist

Description & Protocol

What	The CATCH School Health Promotion Checklist is a tool for conducting a structured observation of signage in the school environment.
Why	The general aim of the checklist is to evaluate a school's health promotion efforts via signage that promotes healthy or unhealthy eating and physical activity
Where	The checklist assesses signage in public areas, gym, and cafeteria environments.
When	The observation is conducted twice a year, once during the fall semester and once during the spring semester. The observation should be carried out toward the end of each semester (November/December for fall, April/May for spring).
Materials	CATCH School Health Promotion Observation Checklist form, clipboard, map of the school, and pen/pencil.

Observation Checklist Protocol

A. Scheduling the observation

The measurement coordinator will contact the school to arrange a time to perform the CATCH School Health Promotion Checklist. The observation needs to be arranged for a time when the observer can access the cafeteria tray lines.

B. Arriving at school

Sign-in at front office and inform front office staff that you will be observing the main hallways, gym, cafeteria, and outside area for health promotion signage. Provide the office staff with the Project Information Sheet for Site Visit.

C. Determining Areas to Observe

You will not observe the entire school, just the main hallways, cafeterias, and gyms. The first, time a school is observed a map will be created to notate which areas will be part of the observations. Follow these steps below to create the map. If a school has already been created, make sure you obtain the map from the Measurement Coordinator before visiting the schools.

1. Obtain a map of the school.
2. Locate the school's cafeteria(s). Note this on the map to be observed
3. Locate the school's gym(s). Note this on the map to be observed
4. Determine the areas of the school that fit the definition of main hallways. Main hallways include the area outside the main office and hallways adjacent to the entrances to the gyms and cafeterias. Cafeterias and gyms often have more than one entrance so make sure you identify all entrances used by students. **DO NOT** include entrances to the gym and cafeteria from the outdoor field areas. **DO** include outdoor entrances to gym and cafeteria if it is a main entrance, such as from a central courtyard area. Note the main hallways on the map.

D. Completing Section A & Section B

Answer the questions in Section A and B while performing the observation

Definitions and Examples for General and Cafeteria Questions

CATCH Middle School Banner (Q1)	Each school was provided one CATCH Middle School banner with the logo below. 
Main Tray Line (Q 4 & 5)	The main tray line is the tray line from which students can purchase the reimbursable school lunch.
A la Carte Tray Line (Q6 & 7)	This is the tray line from which students can purchase a la carte items. That is, all items that are not part of the reimbursable school lunch. This tray line may be the same as the main tray line. Also, there may be more than one a la carte tray line.

E. Completing Section C: Observation Checklist

During the observation you will record various information about each health promotion and WHOA signage observed in the noted areas.

1. Scan the walls for *visible* signage, ignore signage that is difficult to find. All signage documented should be clearly visible (even if you cannot read it until you get closer) when you enter the room. Information, such as brochures or fliers, which require excessive searching, should not be counted.

2. For each piece of health promotion or WHOA food signage you will complete one row in section C, noting the size, if the message is direct or passive, if the sign is school-made made or not, and the content of the sign. Definitions follow.

3. Signs can be targeted to students, faculty, school staff, parents or the community.

What is a Sign?

In many cases sign will be a single poster or banner. However, many times, signs are grouped together as one display, such as a bulletin board or display case, the entire display will be counted as one sign. This is referred to as mixed signage. Signs that are grouped together but are not physically bound by a bulletin board, display case, or other method are counted individually.

Number of Signs

If there are multiple signs that are identical for all categories recorded, instead of recording each sign in an individual row, the observer can record the information in one row and note in this column how many signs this information represents.

Size Category Criteria

Signage will be categorized into one of three size categories that are specified below. There is a gap between the small and medium category. For items that are between the boundaries the observer will use their discretion to decide which category is best. Always select the category based on the entire size of the signage, even if only a portion of the sign contains health promotion or WHOA food content.

	Low End of Range	High End of Range
Small	Index Card (3" x 5")	Tabloid poster (11" x 17")
Medium	24" x 36"	48" x 72"
Large	>48" x 72"	----------

Direct vs Passive Criteria

Direct – The signage contains a message encouraging or directing people to action, or providing them with knowledge concerning the main category. Additionally all Whoa food product logos are classified as direct.

Passive – The signage's intent is not to improve individual's health or encourage them to consume Whoa foods. However, the sign may indirectly do this through images, such as pictures of sports equipment, fruit and vegetables, families eating together, people exercising, etc. Also, sports trophies and pennants, and signage directing people to attend, not participate in, sporting events (e.g. school football game) are passive.

CATCH Branded

Signs, whether professionally or non-professionally made, that are branded with CATCH. This can include the word CATCH, CATCH logos, or Go, Slow, and Whoa language.

Professionally Made Criteria

Record if the signage was professionally printed or if the sign was hand-made or printed non-professionally. Often professionally made signs are glossy and well designed.

CATCH Provided Posters

CATCH provided schools with the posters described below. The observer will record the number of posters present. Often this will just be '1', as the CATCH poster is the sign being documented. However, it could be greater in the case of mixed signage.

Stay Healthy and Be Active Posters – English and Spanish versions.	CATCH provided four different signs – (Stay Healthy, English and Spanish versions, and Be Active, English and Spanish versions). There is a category for each version of the sign. Below are English versions of the posters. Note that these posters fall in the small category for size. Stay Healthy Be Active 

Criteria for Content of Signage Categories

In this section the observer will identify the content (message) of the sign. Signs may fit multiple categories. The categories are defined below. Once the categories are identified the observer will record a number in the row for the sign being observed under the category. The observer will use the Percent of Signage Matching the Criteria scale, defined below, to determine the number to enter.

Category Number	Title	Definition
1.	Go, Slow, Whoa Signage	Signs that use the language of Go, Slow, and Whoa.
2.	WHOA foods	Signs that advertise fast food, junk food, Whoa foods, or foods of minimal nutritional value (FMNV).

3.	Nutrition Signage	Signs must meet one of the following criteria.
		• Contains direct messages that encourage healthier eating
		• Provides information about the connection between good health and nutrition.
		• Promotes events or programs where you go and eat healthy, or learn more about nutrition, whether by participating or observing.
		• Passively promotes healthy eating. This includes the following
		  o Posters of individuals eating healthy foods
		  o Posters of healthy foods

4.	Physical Activity Signage	Signs must meet one of the following criteria.
		• Contains direct messages that encourage being physically active
		• Provides information about the connection between good health and physical activity.
		• Promotes events or programs where you go and be active or learn more about physical activity, whether by participating or observing.
		• Passively promotes physical activity. This includes the following
		  o Posters of individuals being physically active
		  o Posters of sports equipment
		  o Posters advertising sports teams

5.	Social Marketing Campaign Signs	If the observation is of a social marketing school, the observer needs to speak with the CATCH facilitator for the school before conducting the observation. The CATCH facilitator can provide descriptions of the social marketing signs at that specific school
6.	Water Signage	Signs that encourage water consumption and/or provide information about the health benefits of water consumption.
7.	Other Health Promotion Signage	Any signage that promote other health messages. Examples are hand washing, smoking, alcohol and drugs, and sleeping. The required choking poster posted in all cafeterias is not counted.

Percent of Signage Matching the Criteria Scale

This scale is used for Content of Signage Categories.

Often signage, especially mixed signage, will fit multiple signage categories, or only a portion of a sign will fit any category. To account for this, the observer will use the scale below to rate the percentage of the sign that fits the Content of Signage Category. Please note, that there is no expectation that when the numbers entered into categories 1-7 for one row are added together that they should add up to 4 (or 100%).

0 (none)
1 (>0% to 25%)
2 (>25% to 50%)
3 (>50% to 75%)
4 (>75% to 100%)

CATCH School Health Promotion Observation Checklist
Travis County Dell Middle School Project

School: _____ District: _____
Date: ____/____/_____ Time: ___:___
Reliability Observations? Yes No
Lead Observer: ___ ___ ___ Reliability Observer: ___ ___ ___

Section A: General Questions:

1. Please circle the observation area where you saw the CATCH Middle School banner?
    a. Outside Area
    b. Main hallway
    c. Cafeteria
    d. Gym
    e. Did not see banner

2. Was there a CATCH Bulletin Board? Yes No

3. Was there any signage advertising food fundraising sales? This could be sales organized by the school, school clubs, parent organizations, or any other organizations

    a. Yes **[If Yes, please answer 2a and 2b]**

        2a. What organization was running the fundraising sales?_____
        2b. What food was being sold?_____

    b. No

3. Where any health-related policies posted? (Please specify) Yes No

    _____
    _____

Section B: Cafeteria Questions:

4. Was there Go, Slow, and Whoa signage on the main tray line? Yes No

5. Were there signs promoting the sale of Whoa foods on the main tray line? (specify food(s)):_____ Yes No

6. Was there Go, Slow, and Whoa signage on the a la carte tray line? Yes No

7. Were there signs promoting the sale of Whoa foods on the a la carte tray line? (specify food(s)):_____ Yes No

Section C: Observation Checklist: Page ____ of _____

	No. of Signs	Description	Hall, Gym, or Cafe	Size	Direct or Passive	CATCH Branded (Y/N)	Professionally-made (Y/N)	CATCH Provided Posters: Record Number of Posters: Stay Healthy English	Stay Health Spanish	Be Active English	Be Active Spanish	Content of Signage: Percent of Signage Matching the Content (0 (none), 1 (>0% to 25%), 2 (>25% to 50%), 3 (>50% to 75%), 4 (>75% to 100%)): 1. Go, Slow, Whoa	2. Whoa Food	3. Nutrition	4. Physical Activity	5. Social Marketing	6. Water	7. Other Health Promotion
1.	( )		H G C	S M L	D P	Y N	Y N											
2.	( )		H G C	S M L	D P	Y N	Y N											
3.	( )		H G C	S M L	D P	Y N	Y N											
4.	( )		H G C	S M L	D P	Y N	Y N											
5.	( )		H G C	S M L	D P	Y N	Y N											
6.	( )		H G C	S M L	D P	Y N	Y N											
7.	( )		H G C	S M L	D P	Y N	Y N											
8.	( )		H G C	S M L	D P	Y N	Y N											

Notes:

APPENDIX B

CODING PROTOCOL

ADVERTISEMENT PROTOCOL

Advertisements are classified as printed signs, posters, bulletin boards etc. that communicate a message or display a product or picture that is related to foods and/or beverages and/or direct promotion* of physical activity. *Direct promotion is defined as an explicit message (e.g., "Be Active"). If documenting an ad, the coder will not document anything on the "Items" tab of coding template for that same item (i.e., ads cannot be items and items cannot be ads).

If there are additional records that include pictures for another record, only code once. Include the additional pictures/instances as part of the quantity on the coded record. Leave the additional pictures record blank. Add a note on all corresponding records to indicate a trail.

If coder sees a beverage or food item but cannot tell the general food category, do not code for it. I.e., if there is an obvious beverage but you cannot tell if it is soda or milk, do not code for it.

When coding for one of >1 ad in a record, indicate in the notes which ad you are coding for and what other record # the additional ad(s) can be found in.

Signs that say "no food, drink or candy" (or something similar) should not be coded. These were not consistently documented in every school.

FileMaker Field Name	Notes
Ad Number	• Imported from original file • Indicated by notes or marked by data collector
CATCH Brand	• Imported from original file • Indicated by notes or marked by data collector
Original Ad Description	• Imported from original file • Indicated by notes or marked by data collector
Original Advertisement Category	• Imported from original file • Indicated by notes or marked by data collector
Original Advertisement Comm	• Imported from original file • Indicated by notes or marked by data collector
Original CATCH brand	• Imported from original file • Indicated by notes or marked by data collector
Original Location	• Imported from original file • Indicated by notes or marked by data collector

Original Commercial	• Imported from original file • Indicated by notes or marked by data collector
Ad Unique Number	• Imported from original file • Indicated by notes or marked by data collector
General Area where ad is found **1. Hall** **2. Gym** **3. Cafeteria**	• Imported from original file • Indicated by notes or marked by data collector • Originally determined by where advertisement was seen, either in hall, gym or cafeteria of school
Specific area where ad is found **1. Vending Machine** - Advertisement on the exterior of vending machine defined as a machine that dispenses food and/or drinks when a coin, bill, or token is inserted. **2. A la carte** - Advertisements found in an area where food is sold with a separate price for each item and is not associated with the school lunch meal program. **3. Lunch Line** - Advertisements found in area where food is sold as part of the National School Lunch Program **4. Other** - Advertisement location is known, but is not a vending machine, a la carte or lunch line. **5. N/I** - Not identifiable. Location is in the cafeteria, but unknown if location a la carte or lunch line. **88 N/A** - Not applicable. Does not apply to this specific advertisement.	• Will only be coded if stated in notes from original file or obvious from picture. • If we are unable to tell from the methods listed above, we will mark N/I.
Total number of this type of ad found in the general area	• Imported from original file • Indicated by notes or marked by data collector • If this field is blank, the coder should fill in the field with "1."
Overall content of the ad **1. Food** - Advertisements that reference edible items that require chewing	• Code CATCH signs and MyPramid signs that contain Ntr and PA as Other Themes. If MyPyramid sign isn't

2. **Beverage -** Advertisements that reference a drinkable liquid 3. **Both -** Food and Beverage appears in advertisement. CATCH Go, Slow, Whoa line stickers are always categorized as 'both' 4. **Other Themes -** Advertisements that do not reference food or beverage OR that reference food and beverage AND PA 5. **N/I** – Not identifiable. Advertisement was not labeled in original file and is not obvious from picture **88 N/A** – Not applicable. Does not apply to this specific advertisement	clear/notes don't specify, code as both (food & bev) and ntr edu • If Nutrition Education instance and no pic or sufficient description to determine if food/bev both present, code as both
Type of CATCH sign 1. **Food/Beverage** – Advertisements that reference edible items that require chewing. Or advertisements that reference a drinkable liquid 2. **PA** – Advertisements that reference exercising or sports/athletic activity. Official Middle School banner should be coded as this because only passive PA present in image 3. **Both** – Advertisements that reference edible items that require chewing a drinkable liquid AND that reference exercising or sports/athletic activity 4. **Get UR 60 –** Contains logos similar to these; promotes 60 minutes of physical activity 	

 **5. H20** – Advertisements that promote drinking water and may look similar to this:  **6. N/I** - Not identifiable. Classification cannot be determined **88 N/A** – Not applicable. Does not apply to the specific advertisement for instance not CATCH advertisement	
Professionally made CATCH sign or not **1. CATCH Made Sign** – professionally printed signs/posters/banners that have the word CATCH or Coordinated Approach to Child Health **2. Other Made Sign** – hand made or personally printed sign that say CATCH **3. N/I** – Not identifiable. Classification cannot be determined **88 N/A** – Not applicable. Does not apply to the specific advertisement (for instance not	• If the ad is not CATCH branded, code as N/A • Student banner printed by CATCH is considered CATCH Made Sign; likely imported under Original CATCH Ad Type as Non-Professional CATCH; Also may include the following picture:

CATCH advertisement)	 Official CATCH Middle School Banner Image: Coordinated Approach To Child Health CATCH®
Overall purpose of ad **11. A la carte line menu** –Menu board, sign, poster etc. that displays multiple a la carte menu items likely with prices. Recall the a la carte definition: Advertisements found in an area where food is sold with a separate price for each item and is not associated with the school lunch meal program. **12. Breakfast Promo** - Must explicitly promote breakfast (e.g., AmpUp). Any individual items present in the ad should be categorized according to the food	• Do not code for individual Food or Beverage Category fields (for Nutrition Education, Lunch Menu Calendar, A La Carte Line Menu, CATCH signs) • When multiple signs promoting a la carte items are in one record (may include some signs with one or multiple items listed on a sign), code as A La Carte Line Menu • Code CATCH signs and MyPramid signs that contain Ntr and PA as Other. If MyPyramid sign isn't clear/notes don't specify, code as ntr edu

category lists. 13. **Nutrition Edu** - Anything that is presented in an attempt to educate about nutrition or help make better decisions in certain contexts, etc. Examples include GoGreen, Bright Color, Big Flavor, Fill up With Fiber, Vit/Min Info, Water, Fast Food/Convenience store options, Caffeine information, Stay Strong Go Lean promo, Energy Balance info, Portion Control advice, Ntr Label/Nutrition: Get the Facts promo, Go/Slow/Whoa signs 14. **Fuel Up and Play 60** – NFL-sponsored campaign that promotes healthy eating and regular physical activity. Specific logo and/or slogan is present on each promotion instance. Only code for this if it is an exclusive Fuel Up and Play 60 promotion. If in conjunction with something else, code for the most prominent theme (i.e., when predominant theme is Got Milk, but the Fuel Up logo is present, code for Got Milk). 15. **Hanging passive food signs** – signs or posters that display passive promotions of food (e.g., apple, hamburger), not to include commercial products (since logos count as direct promotion) or words that directly promote noncommercial items. Only considered passive if there are no other messages on the advertisement. 16. **Indiv. Item Promo** – Promotion for one item or one item category (e.g., Got Milk? signs, wraps, Epic Burger) 17. **Lunch Menu Calendar** – Calendar format that lists breakfast and/or lunch options available through the National School Lunch Program. 18. **Student-made ad** – may be a sign/poster collage, often with magazine picture cut-outs, or hand-drawn items	

19. **Other** – Identifiable, but does not clearly fit in any of the categories above (i.e., general promotion to eat school meals, recycle promotion, something that promotes Nutrition AND PA) 20. **N/I** – Not identifiable. Classification cannot be determined **88 N/A –** Not applicable. Does not apply to this specific advertisement	
Total Number of Food and/or Beverage Category within each AD	• This is a free text field. • This number should mirror the total number of food and beverage categories filled out • Coder should complete this field AFTER all Food and Beverage Category and associated fields have been completed.
Overall Tone of AD 1. **Healthy** 2. **Unhealthy** 3. **N/I –** Not identifiable. Classification cannot be determined; If both healthy and unhealthy items are present on an advertisement and there is no dominant healthy or unhealthy type, code as N/I; If restaurant names are given without specific food types code as N/I. If unhealthy products are present but overall purpose is not to promote those products, nutrition education, etc. (i.e., recycle promotion that has pictures of products) **88 N/A –** Not applicable. Does not apply to this specific advertisement	• Whatever the coder believes to be the overall tone of the ad. • A la carte line menu – code as unhealthy • Lunch Menu Calendar – code based on item names or pictures on the promo • Breakfast Promo – code based on item names or pictures on the promo • CATCH Slow/Whoa – code as healthy • All Nutrition Edu – code as healthy • Unhealthy or healthy is coded primarily by the pictures rather than by the words on the advertisement (e.g. ad has pictures of pizza, hamburger and lasagna, but says 'eat school meals' then ad is coded as unhealthy because of food pictures) • Default to unhealthy for A la carte line menu or lunch menu calendar
Food Category XX (i.e., 1-5) 1. **Vegetable go** - fresh, frozen, or canned vegetables with no sugar, fat, or small amount of salt added; salad without dressing 2. **Vegetable slow/whoa** - fresh, frozen, or canned vegetables made with vegetable	• Each category of food present (up to five categories*) in the ad should be accounted for by completing Food Category XX (whatever # 1-5) through Direct or Passive Ad Communication XX (whatever # 1-5) fields • Do not code for individual Food or Beverage Category fields (that may be

oils or solid fats; vegetables with salt and/or sugar added; baked, fried, and/or battered vegetables, NOT French fries [these are in chips, etc category]; pickles; salad with dressing
 	
3. **Fruits go** - fresh, frozen, or canned fruits with no sugar or small amount of salt added
 	
4. **Fruits slow/whoa** - fresh, frozen, or canned fruits in light or heavy syrup and/or with sugar or salt added; dried fruit/fruit leather/fruit roll ups/gummie fruit snacks
 	
5. **Breads/muffins/sweet breads go** - whole grain bread, buns, rolls, bagels & pita bread;
 	
6. **Breads/muffins/sweet breads slow/whoa** - white, refined flour bread, buns, rolls, bagels & pita bread; cornbread; muffins, waffles, pancakes, French toast, croissants, biscuits, sweet rolls, doughnuts
 	
7. **Pasta/rice/grains go** - Pasta made with whole grain flour; brown or wild rice; whole grains like amaranth, barley, buckwheat, corn, oats, quinoa, rye; whole wheat like bulgur, cracked wheat, spelt
 	
8. **Pasta/rice/grains slow/whoa** - pasta made with refined flour; instant noodle soups; egg noodles; white or fried rice; rice cakes
 	
9. **Cereals go** whole grain, low-sugar cereals like toasted oats, shredded what, oatmeal, muesli
 	
10. **Cereals slow/whoa** cereals made with refined grains, granola, instant oatmeal
 	
11. **Crackers/chips/popcorn go** - low-fat whole grain crackers, baked tortilla chips (not baked Doritos – these should count as slow/whoa); air-popped popcorn with
	present on the Lunch Menu Calendar or A la carte line menu)
	• *Up to 5 categories of foods should be coded – the coder should begin coding items from the upper left side of the ad and continue coding as if reading a book (left to right, moving down the page/sign) until up to 5 items have been coded.
	• If you can't distinguish between a "go" and a "slow/whoa" item (e.g., for cartoon or hand-drawn food items or pictures with too little detail) code item according to the list below.
	  o Vegetable, fruit, or white milk default to go category
	  o All other products default to slow/whoa category
	• Code for the most visible/clear picture

no salt added 12. **Crackers/chips/popcorn/French fries slow/whoa** - low-fat crackers made with refined grains, high-fat crackers; tortilla chips; baked or regular potato chips; pretzels; other chips like cheese puffs or corn chips; baked or fried French fries; popcorn made with fats and/or salt; flavored popcorn like caramel or cheese; kettle corn; snack mix/Chex mix; cornnuts 13. **Cookies/cake go** - whole-grain animal crackers; graham crackers 14. **Cookies/cake slow/whoa** - refined flour animal crackers; vanilla wafers; cereal/oatmeal/fruit/granola bars; Rice Krispie Treats; Pop Tarts; cookies; cakes 15. **Yogurt/cheese go** - fat-free or low-fat plain or 100% juice-sweetened yogurt, fat-free or low-fat unsweetened yogurt drinks; part-skim natural cheese; low-fat soy or string cheese; low-fat/1% cottage cheese 16. **Yogurt/cheese/sour cream slow/whoa** - fat-free or low-fat sweetened yogurt or yogurt drinks; any whole-milk yogurt or yogurt drinks; natural & processed cheeses that are not low-fat/part-skim [≥2%] such as cheddar, Swiss, Colby, cottage, ricotta, soy, cream, string, cheese sauce; sour cream 17. **Dairy desserts slow/whoa** - frozen yogurt; ice cream; pudding; cheesecake; gelato; whipped cream 18. **Beans/seeds go** - beans like pinto, black, red, garbanzo, peas, lentils, made with no or a small amount of salt and no fat added; pumpkin or sunflower seeds with no added salt, sugar, or fat 19. **Beans/nuts/seeds/trail mix slow/whoa** - beans, peas, & lentils made with fat,	

added sugar and/or salt; refried beans; hummus; falafel; canned baked beans and pork & beans; pumpkin & sunflower seeds made with added salt, sugar and/or fat; nuts (like peanuts, almonds, pecans, walnuts, cashews); nut butters) 20. **Chicken/turkey go** - chicken & turkey without skin - baked, grilled, or broiled 21. **Chicken/turkey slow/whoa** - chicken or turkey with skin – baked, grilled, or broiled; baked or fried breaded chicken or turkey; chicken nuggets; ground chicken or turkey 22. **Fish go** - fish & shellfish like salmon, catfish, shrimp, crab, lobster - baked, grilled, or broiled; tuna canned in water 23. **Fish slow/whoa** - baked or fried breaded fish; tuna canned in oil 24. **Beef go** - lean cuts of beef like round roast, round steak, sirloin, tenderloin; extra lean or drained and rinsed ground beef 25. **Beef slow/whoa** - other ground beef; hamburgers; regular cuts of beef like brisket, T-bone, chuck roast, ribs 26. **Pork go** - lean pork such as pork chops or tenderloin without fat 27. **Pork slow/whoa** - Canadian bacon; regular cuts of pork like roast, shoulder, ribs; bacon; pork skins; ham 28. **Eggs go** - whole eggs; egg whites; egg substitute 29. **Eggs slow/whoa** - fried eggs 30. **Processed meat slow/whoa** - lunch meat; hot dogs; sausage; pepperoni; sausage; beef jerky; bologna; salami; chorizo; pastrami	

31. Sugars/sweeteners/candy slow/whoa - sugar; syrup; artificial sweeteners; brown sugar; candy & gum; Jell-O; honey; molasses; agave nectar **32. Sandwich go** - grilled chicken, turkey, or fish with whole-grain, unbuttered bread, without cheese or mayonnaise **33. Sandwich slow/whoa** - deli meats, chicken, turkey, or fish breaded and/or with skin on refined grain bread, with cheese and/or mayonnaise; may include fish or meat mayo- based, salad-type filling; includes "wraps"; Hot Pockets **34. Hamburger** - any cut of beef or turkey, may be grilled, fried, or broiled, on a hamburger bun, with cheese and/or mayonnaise; veggie burgers are included **35. Pizza** - flat dough baked with toppings including tomato sauce, cheese, vegetables, and/or meat **36. Spaghetti/casserole** - dish that includes noodles and tomato- or cream-based sauce, usually topped with meat and or vegetables; casseroles usually contain a mixture of foods in one dish, with meat and/or poultry, noodles and/or rice, cheese and/or other cream-based sauces; lasagna; macaroni & cheese **37. Mexican** - combination of some or all of the following: tortilla, cheese, beans, meats, tomatoes, avocado and lettuce; examples are enchiladas, taco, burrito, chalupa, taquitos **38. Other** - Any food item that cannot be categorized by the aforementioned definitions **39. N/I** – Not identifiable. Classification cannot be determined **88 N/A** – Not applicable. Not food items	

Quantity of food category XX (i.e., 1-5)	• This is a free text field • Type in the number of foods present in the ad from the chosen food category • For example: If an advertisement has pictures of grapes, apples and bananas. Quantity of food category = 3 for fruits go. • If the advertisement has a picture AND a word(s) *referring to the picture* code for only the pictures (i.e. if a picture of beef and the word beef appear together it counts as 1 for quantity of food category) • If the advertisement has a picture AND a word(s) that *does not refer* to the picture code for both individually (i.e., a picture of beef and the word 'broccoli,' code for each under their respective food categories). • If the advertisement has a word(s) only, code for the word (i.e., the word 'broccoli,' code for as Vegetable Go food categories).
Commercial or Noncommercial Brand XX (i.e., 1-5) **1. Commercial** - Advertisements that include products manufactured by a company under a particular name **2. Noncommercial** - Advertisements that do not include products manufactured by a company under a particular name e.g. cookies wrapped in plastic or a-la-carte items that are sold; Also includes noncommercial **3. N/I -** Not Identifiable**.** Advertisement cannot be identified as commercial or noncommercial **88 N/A** – Not applicable. Does not apply to the specific advertisement.	• When no picture is available and notes do not specify If there was a commercial logo present, assume there was not
Food Commercial Brand XX (i.e., 1-5)	• This is a free text field • Type the brand/product name in all lowercase letters with no spaces between words and no punctuation (formatting is very important!) o For example: poptarts,

	drpepper, coke, chexmix. ○ E.g. Iced D'lites gets written as 'iceddlites' • A brand/product name is considered a trademark or distinctive name identifying a product • Brands/product names may be identified by a logo, trademark symbol, or product name, for example. • If there are multiple brands/product names present for the same food category, type "multiple" into the free-text Food Commercial Brand field.
Food Noncommercial Brand XX (i.e., 1-5) **1. School brand/no brand** – Aramark or things with no brand; E.g. school lunch menu is considered school brand **2. N/I** – Not identifiable. Classification cannot be determined **88 N/A** – Not applicable. Use for commercial brand advertisements	• Code any advertisement for commercial brand products as N/A • When no picture is available and notes do not specify If there was a commercial logo present, assume there was not
Commercial Logo Visible XX (i.e., 1-5) **1. No** – Brand name is used but there is no logo (e.g., If Pizza Hut is written but this logo does not appear, it is considered NO LOGO) Keep in mind that certain product names are the logo (e.g., Doritos), in which case coder should indicate that there is a logo present.   **2. Yes** – Logos appear on advertisement	• When no picture is available and notes do not specify If there was a commercial logo present, assume there was not

3. N/I – Not identifiable. Classification cannot be determined **88 N/A** – Not applicable. Does not apply to the specific advertisement, the advertisement is noncommercial and no brand is associated with it	
Direct or Passive Ad Comm XX (i.e., 1-5) **1. Passive** - No specific message, picture with no words or words do not apply to picture (e.g., "Throw your trash away here" but there is a picture of an apple in the advertisement.) **2. Direct** - Advertisements with an explicit message or verb (e.g., "Eat more fruits and veggies" or "Fruits are healthy"), or includes a commercial food and/or beverage logo) **3. N/I** – Not identifiable. Advertisement was not labeled in original file and is not obvious from picture **88 N/A** – Not applicable. Does not apply to this specific advertisement	
Beverage Category XX (i.e., 1-4) **1. Vegetable/fruit juice go** - 100% juice; frozen 100% fruit juice bars & smoothies; 100% vegetable juice **2. Fruit flavored drinks** -sherbet, sorbet, frozen fruit juice & smoothies with added sugar; lemonade; slushies/fountain punch drinks sports drinks like Gatorade & Powerade also Vitamin Water; Kool-Aid; drink that is labeled as "juice" but is not 100% fruit juice **3. Milk go** - fat-free/skim/non-fat, low-fat/1% plain milk; fortified & unsweetened soy, almond, or rice milk; non-fat dry milk **4. Milk slow/whoa** - 2%/reduced fat or whole milk plain or flavored; flavored fat-free/skim/non-fat or low-fat/1% milk;	• Each category of food present (up to four categories*) in the ad should be accounted for by completing Beverage Category XX (whatever # 1-4) through Direct or Passive Ad Communication XX (whatever # 1-4) fields • *Up to 4 categories of foods should be coded – the coder should begin coding items from the upper left side of the ad and continue coding as if reading a book (left to right, moving down the page/sign) until up to 4 items have been coded. • If you can't distinguish between a "go" and a "slow/whoa" item (e.g., for cartoon or hand-drawn food items or pictures with too little detail) code item according to the list below. o White milk default to go category • Vegetable/Fruit juice, fruit flavored

fortified and sweetened soy, almond, or rice milk; milkshakes **5. Beverage go** - sparkling water; unsweetened decaffeinated tea **6. Beverage slow/whoa** – unsweetened or sweetened tea; energy drinks; coffee and coffee drinks; alcohol **7. Water** - any tap or bottled water that is not flavored or sparkling **8. Soda – Regular** **9. Soda – Diet** **10. Other** - any beverage that does not fit in one of the above categories **11. N/I** – Not identifiable. Classification cannot be determined **88 N/A** – Not applicable. Non-beverage item	drinks, colored milk, beverages (tea, coffee, colored water, canned drinks such as energy drinks, etc.) products default to slow/whoa category • Do not code for individual Food or Beverage Category fields (that may be present on the Lunch Menu Calendar or A La Carte Line Menu) • Code for the most visible/clear picture • For slushie ads and Minute Maid vending machine ads, code for the beverages as "Fruit Flavored Drinks" and code the fruits as "Fruits Go" and "noncommercial"; Code overall ad as "unhealthy"
Quantity of Beverage Category XX (i.e., 1-4)	• This is a free text field • Type in the number of beverages in the beverage category • Code for both words and pictures (i.e. if a picture of beef and the word beef appear together it counts as 2 for quantity of food category) • If the advertisement has a picture AND a word(s) *referring to the picture,* code for only the picture (i.e. if a picture of milk and the word milk appear together it counts as 1 for quantity of beverage category) • If the advertisement has a picture AND a word(s) that *does not refer* to the picture, code for both individually (i.e., a picture of milk and the word 'soda,' code for each under their respective food categories). • If the advertisement has a word(s) only, code for the word (i.e., the word 'milk,' code for as Milk Slow/Whoa beverage categories).
Commercial or Noncommercial Brand XX (i.e., 1-4)	

1. **Commercial** - Advertisements that include products manufactured by a company under a particular name 2. **Noncommercial** - Advertisements that do not include products manufactured by a company under a particular name e.g. cookies wrapped in plastic or a-la-carte items that are sold; Also includes noncommercial 3. **N/I** - Not Identifiable. Advertisement cannot be identified as commercial or noncommercial **88 N/A** – Not applicable. Does not apply to this specific advertisement	
Beverage Commercial Brand XX (i.e., 1-4)	• This is a free text field • Type the brand/product name in all lowercase letters with no spaces and no punctuation between words o For example: coke, drpepper, minutemaid. o E.g. Iced D'lites gets written as 'iceddlites' • A brand/product name is considered a trademark or distinctive name identifying a product or a manufacturer • Brands/product names may be identified by a logo, trademark symbol, or product name, for example. • If there are multiple brands/product names present for the same beverage category, type "multiple" into the free-text Beverage Commercial Brand field.
Beverage Noncommercial Brand XX (i.e., 1-4) 1. **School brand/no brand** – Aramark or things with no brand (e.g., school lunch menu is considered school brand) 2. **N/I** – Not identifiable. Classification cannot be determined **88 N/A** – Not applicable. Use for commercial brand advertisements	• Code any advertisement for commercial brand products as N/A
Commercial Logo Visible XX (i.e., 1-4)	

1. **No** – Brand name is used but there is no logo (e.g., If Pizza Hut is written but this logo does not appear, it is considered NO LOGO). Keep in mind that certain products names are the logo (e.g., Doritos)   2. **Yes** – Logos appear on advertisement 3. **N/I** – Not identifiable. Coder cannot determine if the logo is visible. **88 N/A** – Not applicable. Does not apply to the specific advertisement , the advertisement is noncommercial and no brand is associated with it	
Direct or Passive Ad Comm XX (i.e., 1-4) 1. **Passive** - No specific message, picture with no words or words do not apply to picture. E.g. "Throw your trash away here" and there is a picture of an apple in the advertisement 2. **Direct** - Advertisements with an explicit message or verb (e.g., "Eat more fruits and veggies" or "Fruits are healthy"), or promotion includes a commercial food and/or beverage logo 3. **N/I** – Not identifiable. Advertisement was not labeled in original file and is not obvious from picture **88 N/A** – Not applicable. Does not apply to this specific advertisement	

ITEM PROTOCOL

An item is a food or beverage product (packaged and usually labeled). If the coder is coding something as an item, there will not be any information coded on the ad tab (i.e., ads cannot be items and items cannot be ads).

Code for what is present only. For instance, if there is a cooler with nothing in it, do not complete fields for what it "should" contain (e.g., can't say it holds beverages). Another example is a slushie machine that ha no liquid in it. Cannot code for what is not in it.

FileMaker Field Name	Notes
Item Number	• Imported from original file • Indicated by notes or marked by data collector.
Original Item Description	• Imported from original file • Indicated by notes or marked by data collector
Original Item Display	• Imported from original file • Indicated by notes or marked by data collector
Original Location	• Imported from original file • Indicated by notes or marked by data collector
Original Logo	• Imported from original file • Indicated by notes or marked by data collector
General location of area where item is found **1. Hall** **2. Gym** **3. Cafeteria**	• Imported from original file • Indicated by notes or marked by data collector. • Originally determined by where advertisement was seen, either in hall, gym or cafeteria of school.
Specific area where item is found **1. A la carte** - Items found in an area where food is sold with a separate price for each item and is not associated with the school lunch meal program **2. Lunch Line** - Items found in area where food is sold as part of the National School Lunch Program **3. Other** - Item location is known, but is not a la carte or lunch line **4. N/I** – Not identifiable. Location of item is in the cafeteria, but unknown if in a la carte or lunch line **88 N/A** – Not applicable. Location field does	

not apply to this specific advertisement	
Container of Item **1. Large Drink Machine** - usually for slushies/kool aid/fountain-type drinks **2. Counter Wire Shelves** - usually 3-level for food **3. Cooler** - Number of shelves ≤ 3 **4. Cooler** - Number of shelves ≥ 4 **5. Tall wire shelves** - 4-5 levels; free standing, not on counter; usually for food **6. Clear plastic display** - usually for cookies; usually sitting on a counter **7. Ice cream cooler** – cooler that holds ice cream **8. Vending Machine** - Item is in vending machine defined as a machine that dispenses food and/or drinks when a coin, bill, or token is inserted. **9. Other** – another type of container that is not specified in one of the categories above. **10. N/I** – Not identifiable. Classification cannot be determined **88 N/A** – Not applicable. Does not apply to this item	
Quantity of Containers	• Imported from original file • Indicated by notes or marked by data collector
Overall content of container **1. Food** **2. Beverage** **3. Both**	
Total Number of Food and/or Beverage Category within each container	• This is a free text field. • This number should mirror the total number of food and beverage categories filled out • Coder should complete this field AFTER all Food and Beverage Category and

	associated fields have been completed.
Item Unique Number	• Imported from original file • Indicated by notes or marked by data collector

Food Category XX (i.e., 1-7)
1. **Vegetable go** - fresh, frozen, or canned vegetables with no sugar, fat, or small amount of salt added; salad without dressing
 	
2. **Vegetable slow/whoa** - fresh, frozen, or canned vegetables made with vegetable oils or solid fats; vegetables with salt and/or sugar added; baked, fried, and/or battered vegetables, NOT French fries [these are in chips, etc category]; pickles; salad with dressing
 	
3. **Fruits go** - fresh, frozen, or canned fruits with no sugar or small amount of salt added
 	
4. **Fruits slow/whoa** - fresh, frozen, or canned fruits in light or heavy syrup and/or with sugar or salt added; dried fruit/fruit leather/fruit roll ups/gummie fruit snacks
 	
5. **Breads/muffins/sweet breads go** - whole grain bread, buns, rolls, bagels & pita bread;
 	
6. **Breads/muffins/sweet breads slow/whoa** - white, refined flour bread, buns, rolls, bagels & pita bread; cornbread; muffins, waffles, pancakes, French toast, croissants, biscuits, sweet rolls, doughnuts
 	
7. **Pasta/rice/grains go** - Pasta made with whole grain flour; brown or wild rice; whole grains like amaranth, barley, buckwheat, corn, oats, quinoa, rye; whole wheat like bulgur, cracked wheat, spelt
 	
8. **Pasta/rice/grains slow/whoa** - pasta made with refined flour; instant noodle
	• Each category of food present (up to seven categories*) in the container should be accounted for by completing Food category XX (whatever # 1-7) through Commercial Logo Visible XX (whatever # 1-7) fields
	• *Up to 7 categories of foods should be coded – the coder should begin coding items from the upper left side of the container and continue coding as if reading a book (left to right, moving down the container) until up to 7 items have been coded.
	• If you can't distinguish between a "go" and a "slow/whoa" item (e.g., product packaging/labeling does not provide enough information) code item according to the list below.
	  o Vegetable, fruit, or white milk default to go category
	  o All other products default to slow/whoa category
	• Code for the most visible/clear picture

soups; egg noodles; white or fried rice; rice cakes 9. **Cereals go** whole grain, low-sugar cereals like toasted oats, shredded what, oatmeal, muesli 10. **Cereals slow/whoa** cereals made with refined grains, granola, instant oatmeal 11. **Crackers/chips/popcorn go** - low-fat whole grain crackers, baked tortilla chips (not baked Doritos – these should count as slow/whoa); air-popped popcorn with no salt added 12. **Crackers/chips/popcorn/French fries slow/whoa** - low-fat crackers made with refined grains, high-fat crackers; tortilla chips; baked or regular potato chips; pretzels; other chips like cheese puffs or corn chips; baked or fried French fries; popcorn made with fats and/or salt; flavored popcorn like caramel or cheese; kettle corn; snack mix/Chex mix; cornnuts 13. **Cookies/cake go** - whole-grain animal crackers; graham crackers 14. **Cookies/cake slow/whoa** - refined flour animal crackers; vanilla wafers; cereal/oatmeal/fruit/granola; Rice Krispie Treats; Pop Tarts; cookies; cakes 15. **Yogurt/cheese go** - fat-free or low-fat plain or 100% juice-sweetened yogurt, fat-free or low-fat unsweetened yogurt drinks; part-skim natural cheese; low-fat soy or string cheese; low-fat/1% cottage cheese 16. **Yogurt/cheese/sour cream slow/whoa** - fat-free or low-fat sweetened yogurt or yogurt drinks; any whole-milk yogurt or yogurt drinks; natural & processed cheeses that are not low-fat/part-skim [≥2%] such as cheddar, Swiss, Colby, cottage, ricotta, soy, cream, string,	

cheese sauce; sour cream 17. **Dairy desserts slow/whoa -** frozen yogurt; ice cream; pudding; cheesecake; gelato; whipped cream 18. **Beans/seeds go** - beans like pinto, black, red, garbanzo, peas, lentils, made with no or a small amount of salt and no fat added; pumpkin or sunflower seeds with no added salt, sugar, or fat 19. **Beans/nuts/seeds/trail mix slow/whoa -** beans, peas, & lentils made with fat, added sugar and/or salt; refried beans; hummus; falafel; canned baked beans and pork & beans; pumpkin & sunflower seeds made with added salt, sugar and/or fat; nuts (like peanuts, almonds, pecans, walnuts, cashews); nut butters) 20. **Chicken/turkey go** - chicken & turkey without skin - baked, grilled, or broiled 21. **Chicken/turkey slow/whoa** - chicken or turkey with skin – baked, grilled, or broiled; baked or fried breaded chicken or turkey; chicken nuggets; ground chicken or turkey 22. **Fish go** - fish & shellfish like salmon, catfish, shrimp, crab, lobster - baked, grilled, or broiled; tuna canned in water 23. **Fish slow/whoa** - baked or fried breaded fish; tuna canned in oil 24. **Beef go** - lean cuts of beef like round roast, round steak, sirloin, tenderloin; extra lean or drained and rinsed ground beef 25. **Beef slow/whoa** - other ground beef; hamburgers; regular cuts of beef like brisket, T-bone, chuck roast, ribs 26. **Pork go** - lean pork such as pork chops or tenderloin without fat	

27. Pork slow/whoa - Canadian bacon; regular cuts of pork like roast, shoulder, ribs; bacon; pork skins; ham **28. Eggs go** - whole eggs; egg whites; egg substitute **29. Eggs slow/whoa** - fried eggs **30. Processed meat slow/whoa** - lunch meat; hot dogs; sausage; pepperoni; sausage; beef jerky; bologna; salami; chorizo; pastrami **31. Sugars/sweeteners/candy slow/whoa** - sugar; syrup; artificial sweeteners; brown sugar; candy & gum; Jell-O; honey; molasses; agave nectar **32. Sandwich go** - grilled chicken, turkey, or fish with whole-grain, unbuttered bread, without cheese or mayonnaise **33. Sandwich slow/whoa** - deli meats, chicken, turkey, or fish breaded and/or with skin on refined grain bread, with cheese and/or mayonnaise; may include fish or meat mayo- based, salad-type filling; includes "wraps"; Hot Pockets **34. Hamburger** - any cut of beef or turkey, may be grilled, fried, or broiled, on a hamburger bun, with cheese and/or mayonnaise; veggie burgers are included **35. Pizza** - flat dough baked with toppings including tomato sauce, cheese, vegetables, and/or meat **36. Spaghetti/casserole** - dish that includes noodles and tomato- or cream-based sauce, usually topped with meat and or vegetables; casseroles usually contain a mixture of foods in one dish, with meat and/or poultry, noodles and/or rice, cheese and/or other cream-based sauces; lasagna; macaroni and cheese **37. Mexican** - combination of some or all of	

the following: tortilla, cheese, beans, meats, tomatoes, avocado and lettuce; examples are enchiladas, taco, burrito, chalupa, taquitos **38. Other** - Any food item that cannot be categorized by the aforementioned definitions **39. N/I** – Not identifiable. Classification cannot be determined **88 N/A** – Not applicable. Not food items	
Commercial or Noncommercial Brand XX (i.e., 1-7) **1. Commercial** - Products manufactured by a company under a particular name **2. Noncommercial** – Products that are not manufactured by a company under a particular name (e.g., cookies wrapped in plastic or a-la-carte items that are sold). Also includes noncommercial **3. N/I** - Not Identifiable. Product cannot be identified as commercial or noncommercial **88 N/A** – Not applicable. Does not apply to the specific product	• When no picture is available and notes do not specify If there was a commercial logo present, assume there was not
Food Commercial Brand XX (i.e., 1-7)	• This is a free text field • Type the brand/product name in all lowercase letters with no spaces and no punctuation between words (formatting is very important!) o For example: poptarts, drpepper, coke, chexmix. o E.g. Iced D'lites gets written as 'iceddlites' • A brand/product name is considered a trademark or distinctive name identifying a product • Brands/product names may be identified by a logo, trademark symbol, or product name, for example. • If there are multiple brands/product names present for the same food

	category, type "multiple" into the free-text Food Commercial Brand field. • When no picture is available and notes do not specify If there was a commercial logo present, assume there was not
Food Noncommercial Brand XX (i.e., 1-7) 1. **School brand/no brand** – Aramark or things with no brand/product name; E.g. school lunch menu is considered school brand 2. **N/I** – Not identifiable. Classification cannot be determined for this particular product **88 N/A** – Not applicable. Use for commercial products	• Code any commercial product as N/A • When no picture is available and notes do not specify If there was a commercial logo present, assume there was not
Commercial Logo Visible XX (i.e., 1-7) 1. **No** – There is no commercial logo visible 2. **Yes** – Logos appear on product (keep in mind that some product names are logos e.g. Doritos) 3. **N/I** – Not identifiable. Coder cannot determine if the logo is visible **88 N/A** – Not applicable. Does not apply to the specific product. The product is noncommercial and no brand is associated with it	• When no picture is available and notes do not specify If there was a commercial logo present, assume there was not
Beverage Category XX (i.e., 1-7) 1. **Vegetable/fruit juice go** - 100% juice; frozen 100% fruit juice bars & smoothies; 100% vegetable juice 2. **Fruit flavored drinks** -sherbet, sorbet, frozen fruit juice & smoothies with added sugar;lemonade; slushies/fountain punch drinks sports drinks like Gatorade & Powerade; Vitamin Water Kool-Aid;	• Each category of food present (up to seven categories*) in the ad should be accounted for by completing Beverage Category XX (whatever # 1-7) through Direct or Passive Ad Communication XX (whatever # 1-7) fields • *Up to 7 categories of foods should be coded – the coder should begin coding items from the upper left side of the ad and continue coding as if reading a book

drink that is labeled as "juice" but is not 100% fruit juice **3. Milk go** - fat-free/skim/non-fat, low-fat/1% plain milk; fortified & unsweetened soy, almond, or rice milk; non-fat dry milk **4. Milk slow/whoa** - 2%/reduced fat or whole milk plain or flavored; flavored fat-free/skim/non-fat or low-fat/1% milk; fortified and sweetened soy, almond, or rice milk; milkshakes **5. Beverage go** - sparkling water; unsweetened decaffeinated tea **6. Beverage slow/whoa** – unsweetened or sweetened tea; energy drinks; coffee and coffee drinks; alcohol **7. Water** - any tap or bottled water that is not flavored or sparkling **8. Soda - Regular** **9. Soda - Diet** **10. Other** - any beverage that does not fit in one of the above categories **11. N/I** – Not identifiable. Classification cannot be determined **88 N/A** – Not applicable. Non-beverage item	(left to right, moving down the page/sign) until up to 7 items have been coded. • If you can't distinguish between a "go" and a "slow/whoa" item (e.g., product packaging/labeling does not provide enough information) code item according to the list below. o White milk default to go category • Vegetable/Fruit juice, fruit flavored drinks, colored milk, beverages (tea, coffee, colored water, canned drinks such as energy drinks, etc.) products default to slow/whoa category • Code for the most visible/clear picture
Commercial or Noncommercial Brand XX (i.e., 1-7) **1. Commercial** - Items that include products manufactured by a company under a particular name **2. Noncommercial** - Items that do not include products manufactured by a company under a particular name e.g. cookies wrapped in plastic or a-la-carte items that are sold; Also includes noncommercial) **3. N/I** - Not Identifiable**.** Item cannot be	

identified as commercial or noncommercial **88 N/A** - Does not apply to the specific advertisement	

Beverage Commercial Brand XX (i.e., 1-7)	• This is a free text field
	• Type the brand/product name in all lowercase letters with no spaces and no punctuation between words
	  ○ For example: coke, drpepper, minutemaid.
	  ○ E.g. Iced D'lites gets written as 'iceddlites'
	• A brand/product name is considered a trademark or distinctive name identifying a product or a manufacturer
	• Brands/product names may be identified by a logo, trademark symbol, or product name, for example.
	• If there are multiple brands/product names present for the same beverage category, type "multiple" into the free-text Beverage Commercial Brand field.

Beverage Noncommercial Brand XX (i.e., 1-7) 1. **School brand/no brand** – Aramark or things with no brand (e.g., school lunch menu is considered school brand) 2. **N/I** – Not identifiable. Classification cannot be determined **88 N/A** – Not applicable. Use for commercial brand advertisements	• Code any commercial brand products as N/A
Commercial Logo Visible XX (i.e., 1-7) 1. **No** – There is no commercial logo visible 2. **Yes** – Logos appear on product (keep in mind that some product names are logos e.g. Doritos) 	

3. **N/I** – Not identifiable. Classification cannot be determined **88** **N/A** – Not applicable. Does not apply to the specific item. The item is noncommercial and no brand is associated with it	

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